VETERINARY MEDICINE

A Monthly Magazine Devoted to the Promotion of the Art and Science of Veterinary Medicine

Vol. XLV MAY 1950 No. 5

Published Monthly by the

VETERINARY MAGAZINE CORPORATION

Suite 803, Livestock Exchange Building
Kansas City 15, Missouri, U.S.A.
Telephone: Victor 2985

EDITOR

ROBERT L. ANDERES, B.S., D.V.M.

CONSULTING EDITOR

D. M. CAMPBELL, D.V.S.

DEPARTMENT EDITORS

R. R. DYKSTRA, D.V.M.
Manhattan, Kansas
A. O. FOSTER, B.A., M.A., Sc.D.
Beltsville, Maryland
W. R. HINSHAW, D.V.M., Ph. D.
Frederick, Maryland

REPRESENTATIVES

H. J. Mostyn, P. O. Box 391, Dover, N. J.
G. W. Campbell, 43 E. Northrup, Buffalo, N. Y.

SUBSCRIPTION RATES: One year, $5.00; two years, $8.75; three years, $12.00; five years, $18.00. Single copy, 50c. U. S. Currency. Postage prepaid. Authorized agents will present letter of collection authority. Pay no money to others.

Entered as second class matter at the post office at Kansas City, Missouri. Entered as second class matter under the title of the American Journal of Veterinary Medicine, July 19, 1910, at Chicago, Illinois, under the Act of March 3, 1879.

All matter appearing in this publication is copyrighted. No part of it may be reproduced without written permission. Permission will be given if the purpose is unobjectionable. If there be any question as to the propriety of reproduction the author will be consulted.

CHANGE OF ADDRESS: Prompt notice of change of address is requested to assure accurate mailing, giving old and new address. Address all communications to Veterinary Medicine, Suite 803, Livestock Exchange Bldg., Kansas City 15, Missouri.

AUTHOR-CONTRIBUTORS: Articles submitted for publication are accepted as original communications and with the understanding that they are not submitted to other journals. Manuscripts should be clearly typed, double spaced with wide margins, and sheets numbered consecutively. See prior issues for style. Tables and charts should be simple and clearly illustrate the text material.

Copyright, 1950, by the Veterinary Magazine Corporation, Kansas City 15, Missouri.

In This Issue . . .

The Development of Helminthiasis in Thoroughbred Foals in Central Kentucky—A. C. Todd, M. F. Hansen, C. W. Kelley, Z. N. Wyant, and F. E. Hull 181

Hypoglycemia in Baby Pigs—Jesse Sampson 187

Myoclonia Congenita: A Disease of Newborn Pigs—H. C. H. Kernkamp 189

The Use of Vaginal Suppositories in Veterinary Practice—J. David Schaffer 191

Clinical Diagnosis and Treatment of Canine Leptospirosis—R. E. Witter 193

Principles of Animal Health— R. R. Dykstra 196

Management of Sheep on Needlegrass Ranges to Reduce Mechanical Injuries—Vernon A. Young 197

The Treatment of Chronic Bovine Mastitis with Aureomycin—R. A. Packer 199

Reflections of a Veterinary Practitioner—A. M. McDermid 202

Electric Pig Brooder 204

Anthrax in Livestock During 1949 and Incidence of the Disease from 1945 to 1949—C. D. Stein 205

Editorial Comments . . .

Disinfectant Solution Dips for Hatching Eggs 204

Meeting of Foot-and-Mouth Disease Advisory Committee 208

Diagnosis of Pregnancy in Cattle 209

Lactic Acid Dairy Products 209

Progress of Foot-and-Mouth Disease Campaign in Mexico 210

Make-Believe Veterinarians 213

Curare as Support of Narcosis and Therapy 213

Paper Towels for Cleaning Cows' Udders XXII

Baranti's Veterinary Hospital 212

Poultry Practice Problems—W. R. Hinshaw 214

Veterinary Parasitology—A. O. Foster 215

Abstracts of Literature . . .

Desoxycorticosteron, a Hormone for the Treatment of Acetonemia in Cattle 216

Sudden Death Following Narcosis with Chloral Hydrate 216

Antibodies After Rabies Vaccination 216

Book Reviews . . .

Federal Food, Drug, and Cosmetic Act—Vincent A. Kleinfeld and Charles Wesley Dunn 217

Danny and the Dog Doctor—Jerrold Beim 217

Radiology in Small Animal Practice; A Text on Applied Radiography and Diagnosis—Gerry B. Schnelle 217

Foreign Veterinary Textbooks 218

Veterinarian—Thomas J. Jones 218

Veterinary Items of Interest 220

Announcements XXIII

Examinations XXVI

Coming Meetings XXVII

Necrology XXXV

VETERINARY MEDICINE

A Monthly Magazine Devoted to the Promotion of the Art and Science of Veterinary Medicine

Vol. XLV MAY 1950 No. 5

Published Monthly by the

VETERINARY MAGAZINE CORPORATION

Suite 803, Livestock Exchange Building
Kansas City 15, Missouri, U.S.A.
Telephone: Victor 2985

EDITOR

ROBERT L. ANDERES, B.S., D.V.M.

CONSULTING EDITOR

D. M. CAMPBELL, D.V.S.

DEPARTMENT EDITORS

R. R. DYKSTRA, D.V.M.
Manhattan, Kansas
A. O. FOSTER, B.A., M.A., Sc.D.
Beltsville, Maryland
W. R. HINSHAW, D.V.M., Ph. D.
Frederick, Maryland

REPRESENTATIVES

H. J. Mostyn, P. O. Box 391, Dover, N. J.
G. W. Campbell, 43 E. Northrup, Buffalo, N. Y.

SUBSCRIPTION RATES: One year, $5.00; two years, $8.75; three years, $12.00; five years, $18.00. Single copy, 50c. U. S. Currency. Postage prepaid. Authorized agents will present letter of collection authority. Pay no money to others.

Entered as second class matter at the post office at Kansas City, Missouri. Entered as second class matter under the title of the American Journal of Veterinary Medicine, July 19, 1910, at Chicago, Illinois, under the Act of March 3, 1879.

All matter appearing in this publication is copyrighted. No part of it may be reproduced without written permission. Permission will be given if the purpose is unobjectionable. If there be any question as to the propriety of reproduction the author will be consulted.

CHANGE OF ADDRESS: Prompt notice of change of address is requested to assure accurate mailing, giving old and new address. Address all communications to Veterinary Medicine, Suite 803, Livestock Exchange Bldg., Kansas City 15, Missouri.

AUTHOR-CONTRIBUTORS: Articles submitted for publication are accepted as original communications and with the understanding that they are not submitted to other journals. Manuscripts should be clearly typed, double spaced with wide margins, and sheets numbered consecutively. See prior issues for style. Tables and charts should be simple and clearly illustrate the text material.

Copyright, 1950, by the Veterinary Magazine Corporation, Kansas City 15, Missouri.

In This Issue . . .

The Development of Helminthiasis in Thoroughbred Foals in Central Kentucky—A. C. Todd, M. F. Hansen, C. W. Kelley, Z. N. Wyant, and F. E. Hull 181

Hypoglycemia in Baby Pigs—Jesse Sampson 187

Myoclonia Congenita: A Disease of Newborn Pigs—H. C. H. Kernkamp 189

The Use of Vaginal Suppositories in Veterinary Practice—J. David Schaffer 191

Clinical Diagnosis and Treatment of Canine Leptospirosis—R. E. Witter 193

Principles of Animal Health— R. R. Dykstra 196

Management of Sheep on Needlegrass Ranges to Reduce Mechanical Injuries—Vernon A. Young 197

The Treatment of Chronic Bovine Mastitis with Aureomycin—R. A. Packer 199

Reflections of a Veterinary Practitioner—A. M. McDermid 202

Electric Pig Brooder 204

Anthrax in Livestock During 1949 and Incidence of the Disease from 1945 to 1949—C. D. Stein 205

Editorial Comments . . .

Disinfectant Solution Dips for Hatching Eggs 204

Meeting of Foot-and-Mouth Disease Advisory Committee 208

Diagnosis of Pregnancy in Cattle 209

Lactic Acid Dairy Products 209

Progress of Foot-and-Mouth Disease Campaign in Mexico 210

Make-Believe Veterinarians 213

Curare as Support of Narcosis and Therapy 213

Paper Towels for Cleaning Cows' Udders XXII

Baranti's Veterinary Hospital 212

Poultry Practice Problems—W. R. Hinshaw 214

Veterinary Parasitology—A. O. Foster 215

Abstracts of Literature . . .

Desoxycorticosteron, a Hormone for the Treatment of Acetonemia in Cattle 216

Sudden Death Following Narcosis with Chloral Hydrate 216

Antibodies After Rabies Vaccination 216

Book Reviews . . .

Federal Food, Drug, and Cosmetic Act—Vincent A. Kleinfeld and Charles Wesley Dunn 217

Danny and the Dog Doctor—Jerrold Beim 217

Radiology in Small Animal Practice; A Text on Applied Radiography and Diagnosis—Gerry B. Schnelle 217

Foreign Veterinary Textbooks 218

Veterinarian—Thomas J. Jones 218

Veterinary Items of Interest 220

Announcements XXIII

Examinations XXVI

Coming Meetings XXVII

Necrology XXXV

The Development Of Helminthiasis in Thoroughbred Foals in Central Kentucky†

A. C. TODD*, Ph.D., M. F. HANSEN*, Ph.D., G. W. KELLEY*, B.S., Z. N. WYANT*, M.S. and F. E. HULL*, D.V.M.

MORE different species of helminths in greater numbers parasitize horses than any other domesticated animal. The total effect of any given species in a horse is always detrimental. At least two of the more than 50 species which inhabit horses can directly cause the death of their host. Mortalities and inhibition of development and performance resulting from helminth infection in foals are among the paramount problems at Thoroughbred nurseries in Central Kentucky.

A survey which seeks to delineate the time of first appearance of helminth infections in Thoroughbred foals, along with the subsequent progress of the infections, and methods of preventing and controlling infections, was initiated with the foaling season of 1948. This 1948-49 survey is based on data obtained from six representative nurseries and is similar in purpose to that reported by Russell[1], who worked with 26 Thoroughbred foals in England. The Kentucky survey is being continued with Thoroughbreds foaled in 1949 and will be concluded with a study of foals born in 1950.

The present paper records the development and progressive course of helminth infections in 45 Thoroughbred sucklings and weanlings. Methods of anthelmintic treatment and methods of controlling worm infections now in use at the six nurseries are also detailed.

Methods

The survey is based entirely upon counts of worm eggs found in feces of individual foals. Recognition of worm eggs in feces is a definitive diagnosis of infection.

At the time of birth a sample of meconium was obtained from each newborn foal, together with a sample of manure from the mare, and examined for worm eggs. A weekly manure sample from each foal in the survey was obtained and examined during the entire year, 1948. Weekly examinations were also made of the dams of the individual foals, until weaning time when they were turned out. The survey included ten mares and foals at Farm A, six at Farm B, nine at Farm C, ten at Farm D, five at Farm E, and five at Farm F. The birth dates of the foals in the survey were as follows: Farm A, January 19 to March 16; Farm B, February 5 to March 30; Farm C, March 16 to May 17; Farm D, January 26 to March 25; Farm E, February 27 to April 13; and Farm F, March 24 to April 13.

The individual samples for the counts were prepared for microscopical examination by the method given below.

A 5 gm. sample of feces is mixed with tap water in a clean beaker. A finely divided mixture is obtained, which is then passed through a 40-mesh copper screen to remove coarse particles. The suspension passing through the screen is collected in a second clean beaker and then concentrated in one 15 cc. centrifuge tube. The solid centrifugate obtained is diluted to a 4 cc. volume with tap water and mixed into a uniform suspension. A single drop of the suspension is placed on a clean glass slide, covered with a ⅞ inch square cover slip, and the entire preparation is examined systematically. A count of eggs present in the drop, representing 1/16 or 1/20 of the total number of eggs in a gram, dependent upon the diameter of the pipette used to obtain the drop, is secured.

Eggs observed are classified into three categories, *viz.*: ascaris (*Parascaris equorum*), *Strongyloides* sp. and strongyles. Eggs of the bloodworm *Strongylus vulgaris* are recorded therefore as strongyles because they are indistinguishable from the eggs of a number of other species of strongyles.

Development of Ascaris Infections in Foals

Each of the foals in the survey became infected by *P. equorum*. The progressive development of these infections is shown in figures 1 and 2.

†The investigation reported in this paper is in connection with a project of the Kentucky Agricultural Experiment Station and is published by permission of the director.

*Department of Animal Pathology, Kentucky Agricultural Experiment Station, Lexington.

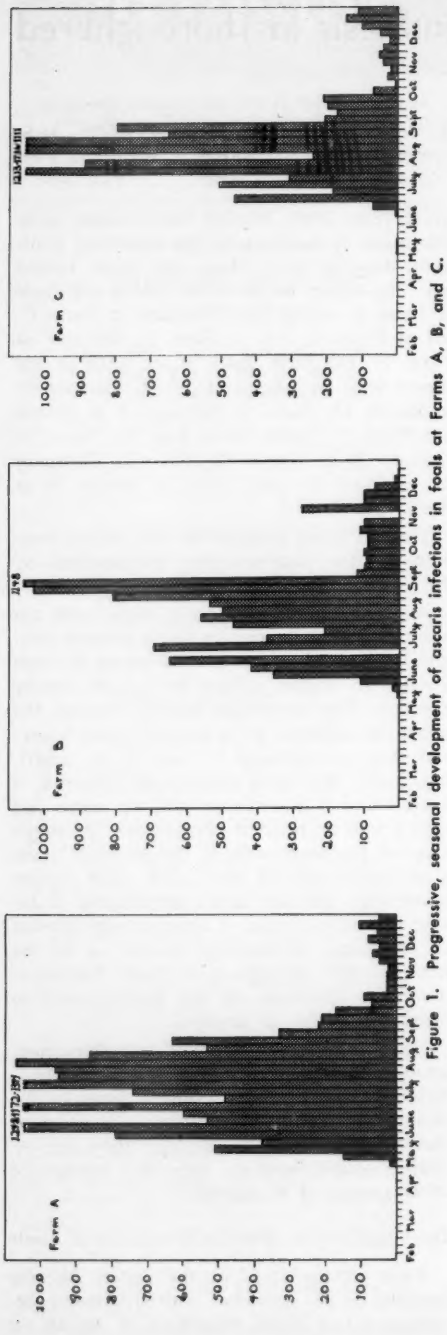


Figure 1. Progressive, seasonal development of ascaris infections in foals at Farms A, B, and C.

The average age of the foals at the time of first appearance of ascaris eggs in their feces ranged from nine to 14 weeks and averaged 12.0 weeks at Farm A. At Farm B, the range and average were ten to 15 weeks, and 12.3, weeks respectively. At Farm C, the range and average were two to 14, and 10.0 weeks; at Farm D, six to 15 and 11.7 weeks; at Farm E, ten to 13 and 10.7 weeks; and at Farm F, nine to 13 and 10.6 weeks.

Eggs of ascaris appeared in feces of the 45 foals in the 1948-49 survey at an average age of 11.3 weeks. This finding agrees closely with Russell's (*ibid.*) report of the average time of appearance of ascaris infection in the 26 Thoroughbred foals in England as 12 to 13 weeks. Eggs passed by a foal at Farm C at the age of two weeks were probably the result of coprophagia; eggs were observed at two and three weeks and then did not reappear until the foal was ten weeks of age. The dam of this foal was infected with ascaris. Three foals which gave first evidence of infection at six weeks of age, two at Farm C and one at Farm D, did not in the subsequent weekly samples pass ascaris eggs consistently until they were 11 weeks of age. These three records were also due doubtless to coprophagia. The commonly accepted time interval required by ascaris to mature in horses following exposure to infective eggs is eight to ten weeks. Prenatal infection with *P. equorum* has not been recorded.

Development of Strongyloides Infections in Foals

Each of the foals in the survey became infected with a species of Strongyloides, probably *Strongyloides westeri* (Ihle), 1917. The progressive development of these infections is shown in figures 3 and 4.

The average age of the foals at the time of first appearance of Strongyloides eggs ranged from birth to six weeks and averaged 2.1 weeks at Farm A. At Farm B, the range and average were birth to seven weeks, and 2.8 weeks, respectively. At Farm C, the range and average were one to eight, and 3.2 weeks; at Farm D, one to ten, and 3.8 weeks; at Farm E, birth to six weeks, and 3.0 weeks; and at Farm D, two to 24, and 11.2 weeks.

The courses of infections with Strongyloides were not influenced by treatment with carbon bisulfide nor phenothiazine and appeared to be self-limiting. After the first appearance of eggs in the feces of an individual foal, the numbers of eggs passed generally reached their

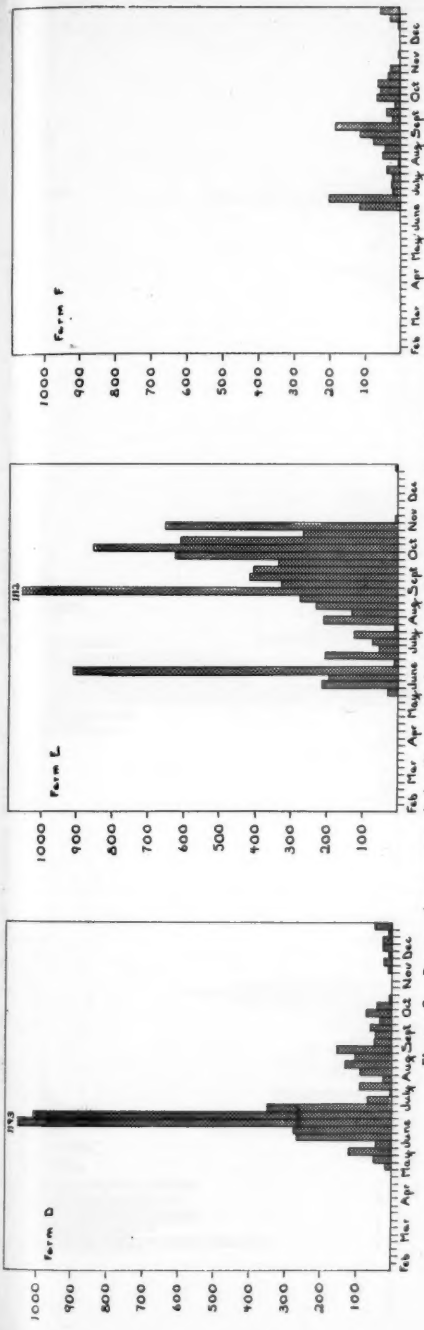


Figure 2. Progressive, seasonal development of ascaris infections in foals at Farms D, E, and F.

highest count in a few more weeks. The patterns of the six groups of foals recorded in figures 3 and 4, show peaks which in most instances were mainly derived from a single foal. The highest count obtained for an individual foal was 19,776 eggs per gram.

At Farm A, the average age of the foals at the time of the last appearance of Strongyloides eggs ranged from 13 to 21 weeks and averaged 16.5 weeks. At Farm B, the range and average were 17 to 24 weeks, and 20.2 weeks, respectively. At Farm C, the range and average were 14 to 34, and 16.8 weeks; at Farm D, 18 to 26, and 21.8 weeks; at Farm E, 21 to 30, and 26.2 weeks; and at Farm F, 16 to 32, and 24.8 weeks.

Eggs of *Strongyloides* sp. recovered from the meconium of four newborn foals are not recorded here as more than indicative of prenatal infection because adult specimens were not recovered. The foals in the survey were not, naturally, available for postmortem examination.

Development of Strongyle Infections in Foals

Each of the foals in the survey became infected by strongyles. The progressive development of these infections is shown in figures 5 and 6.

The average age of the foals at the time of first appearance of strongyle eggs in their feces ranged from one to eight weeks, and averaged 3.2 weeks at Farm A. At Farm B, the range and average were one to three weeks, and 2.2 weeks, respectively. At Farm C, the range and average were one to five, and 1.6 weeks; at Farm D, two to 40 and 14.8 weeks; at Farm E, one to four, and 2.2 weeks; and at Farm D, birth to five weeks, and 2.0 weeks.

The youngest foal passing strongyle eggs had them present in its meconium. One foal gave no evidence of infection until it was 40 weeks of age. Seventeen of the 45 foals were passing eggs by the time they were one week old. Thirty-four of the 45 foals were passing strongyle eggs by the time they reached an age of four weeks.

The strongyle eggs recorded from very young foals, one to four weeks of age, almost invariably diminished in number in subsequent weeks. Infections appeared to be firmly established at an average age of 7.5 weeks. After the infections were once established their courses appeared to be conditioned only by the amount of infection available at the different farms and the anthelmintic treatment the foals received.

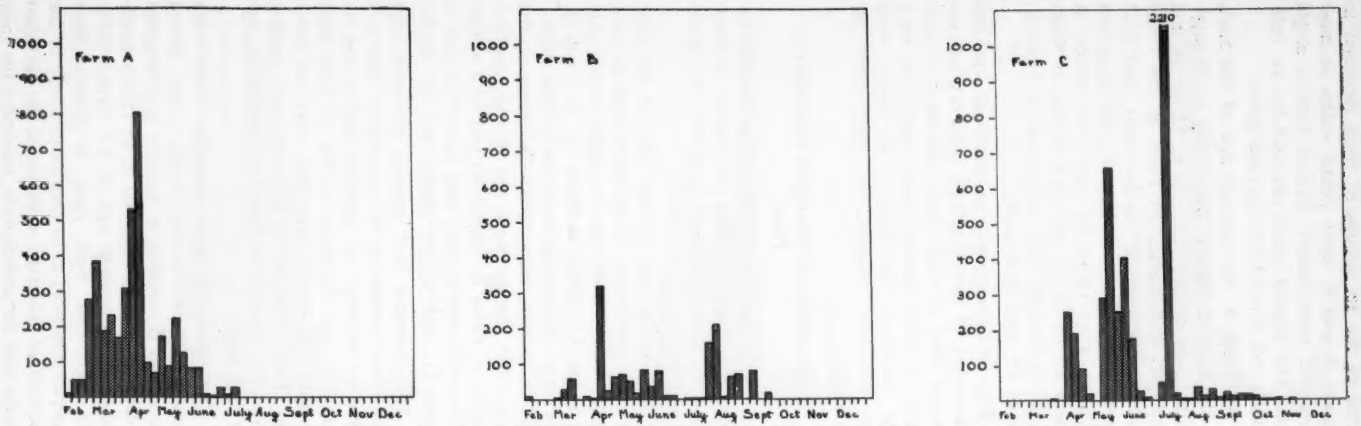


Figure 3. Progressive, seasonal development of Strongyloides infections in foals at Farms A, B, and C.

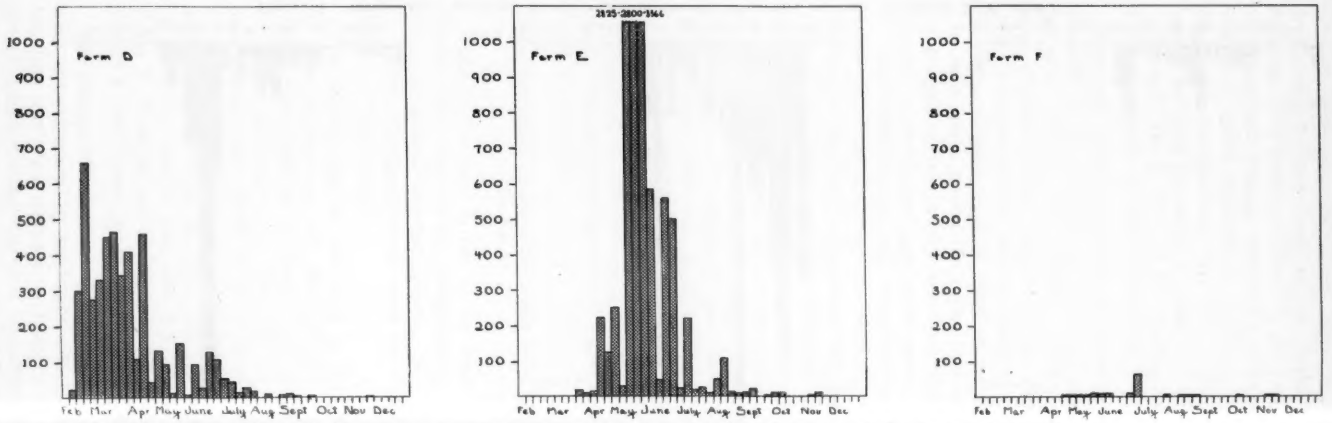


Figure 4. Progressive, seasonal development of Strongyloides infections in foals at Farms D, E, and F.

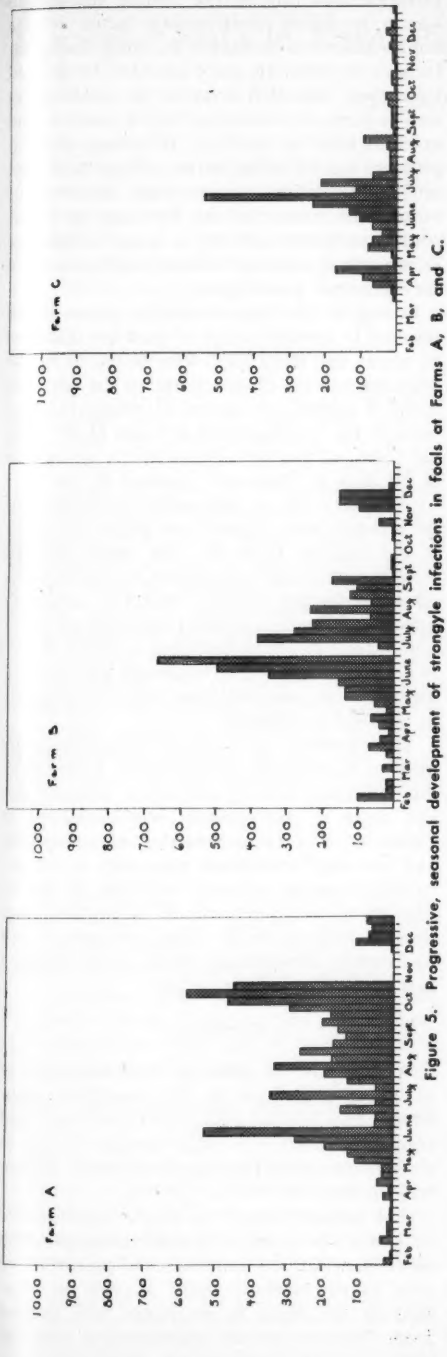


Figure 5. Progressive, seasonal development of strongyle infections in foals at Farms A, B, and C.

Figure 4. Progressive, seasonal development of Strongyloides infections in foals at Farms D, E, and F.

The sudden appearance of strongyle eggs in the feces of young foals and their equally abrupt disappearance before definite maturity of infections was certainly indicative of coprophagia. Coprophagia on the part of foals appears to be a universal habit. The very early age of first appearance might also indicate prenatal infection.

Anthelmintic Treatment Received by Foals

Methods of animal management and hygienic practices in use at the six nurseries were not found sufficient in themselves to prevent or control worm infections. At each of the six nurseries, prevention and control were in final analysis absolutely dependent upon anthelmintic treatment.

The symptomatology of worm infection is masked ordinarily by truly excellent feeding programs at the various farms. Regular definitive diagnosis of infection and treatment of individual foals have been exceptions to a routine where the first anthelmintic treatment has been scheduled for the period somewhat before or after weaning.

The two drugs of choice for anthelmintic treatment of sucklings and weanlings in Central Kentucky are carbon bisulfide and phenothiazine. The therapeutic dosage of carbon bisulfide used for reduction of ascaris infections in sucklings and weanlings is 3 dr., customarily administered by means of a stomach tube. The carbon bisulfide is given by itself or in a mixture with a phenothiazine suspension. The therapeutic dosage of phenothiazine used for reduction of strongyle infections is ½ oz., or 10-15 gm. Ordinarily the phenothiazine in a suspension is administered with a stomach tube.

Since the drugs of choice, carbon bisulfide and phenothiazine, were employed for treatment of foals at each of the six farms in the survey, the very fine control of ascaris infections at Farm F and the tremendously effective control of strongyle infections at Farm D were obviously due to the schedules or methods of treatment employed at these two farms.

At Farm F, the average age of the sucklings at the time of first maturity of ascaris was 10.6 weeks and they received first treatment when the average age was 10.8 weeks. Less than a week, therefore, intervened between first maturity of ascaris and their removal. The time interval between first maturity of ascaris and time of first treatment ranged up to nearly three months at other farms in the survey.

Initial ascaris infections in sucklings were found to be derived from residual contaminations which had survived winter in stalls, pad-

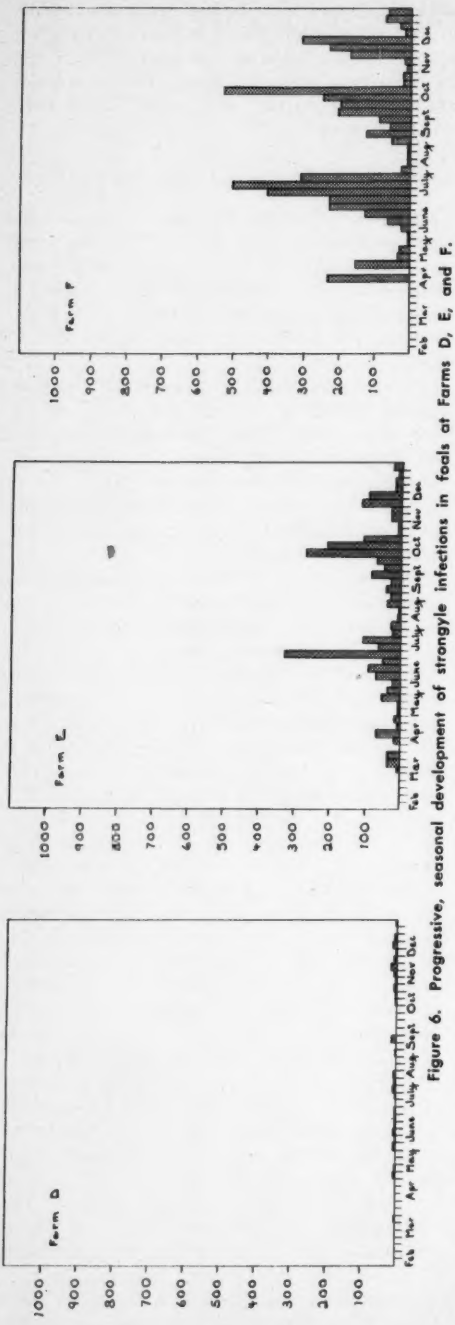


Figure 6. Progressive, seasonal development of strongyle infections in foals at Farms D, E, and F.

docks and pastures first used by newborn foals. Infection was rare in the foaling mares and was a negligible contributing factor to the initial infections sustained by their foals. Infections in weanlings were found to be derived from their infections acquired as sucklings, as well as from contamination left on pastures and in barns used by yearlings. Weanlings customarily are moved to the barns and pastures used until mid-summer by yearlings. Removal of ascaris infection from the sucklings by therapeutic treatment evidently is a useful measure in preventing subsequent heavy infection when they become weanlings.

Strongyle infections in foaling mares, which resulted in contamination of pastures occupied by mares and their foals, were found to be the principal sources of infections for the newborn foals. A method of control of strongyle infections in the foaling mares at Farm D, by feeding 2 gm. of phenothiazine daily in a schedule of 20 days of treatment followed by ten days of no treatment, is responsible, evidently, for the effective prevention of any heavy infections in the foals at Farm D. The results derived from the system of intermittent low-level phenothiazine therapy for the control of strongyle infection in mares and the prevention of infection in foals has been described in detail, Todd, *et al*[2,3,4]. The method of treatment was outlined together with empirical observations on horses in the field by Dimock[5].

The customary schedule of therapeutic treatment of mares with phenothiazine, a drench in the fall when foaling mares are brought up, and again in mid-summer, was employed at Farms A, B, C; a combination of therapeutic and low-level treatments was used in an extremely irregular schedule at Farms E and F. The comparative records of strongyle infections in foals at the six farms (Figures 5 and 6), clearly demonstrate which foals received best protection from infection.

Summary

A survey of the incidence and development of worm infections in Thoroughbred foals, which also sought sources of infection and control methods, was initiated with 45 foals at six representative Thoroughbred farms in Central Kentucky in 1948.

The primary source of ascaris infection for sucklings was found to be contamination which survived winter on paddocks and pastures first used by the newborn foals. A cycle of infection in the foals as weanlings was derived from their own earlier infections and infection

(*Continued on page* 195)

Hypoglycemia In Baby Pigs

JESSE SAMPSON, B.S., D.V.M., Ph.D.,* Urbana, Illinois

ACCORDING to Wiggers[10], basal hypoglycemia results from (1) disturbances in the regulation of carbohydrate combustion, (2) interference with storage or release of glycogen deposited in the liver and muscles, and (3) in consequence of an abnormal loss of glucose by the kidneys.

Effect of Hypoglycemia

With regard to the effect of hypoglycemia or critically low blood sugar level, Dukes[1] states that "severe hypoglycemia due to any cause, results in coma, and in some species, convulsions, because of insufficient glucose for the metabolic requirements of the central nervous system. As a further result of the disturbed metabolism of the nerve centers, efferent impulses pass to the adrenal glands via the splanchnic nerves and cause an increased output of the hormone adrenalin. This stimulates the sympathetic nerves of the liver and accelerates the conversion of glycogen to glucose, which is added to the blood. However, this addition is insufficient to restore the blood sugar level to normal. Injection of glucose abolishes the symptoms of hypoglycemia."

Spontaneous and Experimental Hypoglycemia of Baby Pigs

The occurrence of spontaneous hypoglycemia in newly born pigs was first reported by Graham, Sampson and Hester in 1941[2]. Since that time, Sampson and associates[3,4,7,8,9] have published additional reports concerning observations made in clinical and experimental hypoglycemia of baby pigs. A brief review of these observations is given in this discussion.

Cause of Spontaneous Hypoglycemia in Baby Pigs

This condition in baby pigs is believed to be caused by inadequate absorption of glucose from the intestine and exhaustion of the glycogen supply in the liver. Inadequate absorption of glucose from the intestine, in turn, is believed to result from one of three causes, *viz.*: (1) failure of the sow to secrete enough milk or (2) failure of the pigs to ingest enough milk because of inappetence associated with some form of digestive disturbance, such as scours, or (3) failure of the curd to pass from the stomach into the intestine for further digestion and absorption.† Thus the predisposing or basal cause of hypoglycemia in baby pigs appears to come under (2) in the broad classification of Wiggers. It should be noted that inadequate storage of glycogen in the liver of affected pigs is apparently not due to interference with the process of glycogen deposition, but rather to an inadequate amount of glucose entering the blood for deposition in the liver. (In older pigs gluconeogenesis may be an important source of liver glycogen and blood sugar.)[5]

Occurrence

Hypoglycemia may occur (1) independently, or (2) as a complication of some other condition. For example, it occurs independently whenever the sow fails to begin secreting milk soon after farrowing or dries up during the early stage of lactation, particularly if agalactia develops during the first week after farrowing. In either case, the baby pig is apparently not able to maintain a normal level of blood sugar unless it is given supplementary feeding or is placed with a sow that produces an adequate milk flow.

Hypoglycemia, as a complication of some other condition, is exemplified by abnormally low blood sugar which often accompanies scours or diarrhea in newly born pigs. In this instance, the pigs frequently develop anorexia and stop nursing.

Time Required for Hypoglycemia to Develop

The length of time required for this condition to develop in fasted baby pigs depends upon several influences. The level of blood sugar at birth, age, and environmental temperature during fasting (starvation or inanition) largely determine how long healthy pigs will live before they die in coma.

When no milk or other nutrient is ingested following birth, newly born pigs usually de-

*Professor and head of Department of Veterinary Physiology and Pharmacology, College of Veterinary Medicine, University of Illinois.

†No satisfactory method has as yet been found to prevent or alleviate this last condition.

UNIVERSITY OF ILLINOIS LIBRARY

velop hypoglycemic coma in from 24 to 48 hours. On the other hand, if the pigs are four or five days of age before they are deprived of milk or other nourishment, fatal hypoglycemia ordinarily does not develop until approximately 150 hours have elapsed. Water or physiological saline will not prolong the life of these pigs.

That environmental temperature is an important influence is shown by the observations of Morrill[8], that fasted newborn pigs live only about 24 hours when kept at a temperature of approximately 60 F. whereas they live an average of 80 hours when kept at about 90 F., before coma and death result.

Symptoms and Diagnosis

No pathognomonic symptoms characterize hypoglycemia of baby pigs although convulsions, aimless movements of the head and legs and coma, especially coma and aimless movements, are observed in the terminal stage. Erection of hair and weak squeals are also symptoms but cannot be said to be pathognomonic. The body temperature is uniformly low or subnormal, especially in the late stage. This is a helpful but again not a pathognomonic symptom. Quantitative chemical analysis of the blood for sugar is the only sure way of diagnosis. Nevertheless, the history and symptoms that have been mentioned are helpful signs. A favorable response to an injection of glucose, providing the injection is given before the pig has been in coma for one or more hours, is also a helpful diagnostic sign.

Treatment

Experience has shown that it is necessary to give repeated injections of glucose to maintain a normal level of blood sugar in the baby pig affected with hypoglycemia. These injections are usually given intraperitoneally at four, five, or six hour intervals. Some veterinarians inject 15 cc. of 5% sterile glucose in saline while others inject 3 to 5 cc. of sterile 50% glucose. It is believed that the isotonic solution of 5% concentration has less tendency to cause dehydration than the more concentrated solution.

Injection of glucose should be looked upon as rapid but only temporary relief. If the sow does not secrete enough milk and if other sows with litters are available, it is more practical to divide the affected pigs among these sows. If this plan cannot be followed, the pigs can be fed cow's milk. Too much milk should not be given at each feeding but the feedings should be frequent. A number of formulas have been recommended for orphan pigs. Cary recommends the following: cow's milk, one pound; lime water, one pound; cream, four ounces; sugar, four tablespoons, or Karo syrup, six tablespoons. The pigs are fed five or more times each day but care is taken that they are not overfed. A good rule to follow is to keep them reasonably well satisfied but willing to take more milk than the amount given at each feeding.

If scours or other digestive disorders are involved, appropriate treatment should also be given for these conditions.

Prevention

No system of feeding pregnant sows seems to be entirely effective in preventing hypoglycemia in baby pigs. A liberal ration, containing adequate amounts of protein, carbohydrate, vitamins and essential minerals fed before, as well as during pregnancy, has been shown to be helpful in assuring adequate lactation. In those gilts and sows that do not begin to secrete milk, or dry up, despite good nutrition, lactation can often be induced by giving several injections of pituitrin. Pinkerton[6] says that if "sows fail to settle down and permit pigs to nurse soon after farrowing, posterior pituitary extract in from 3 to 5 cc. doses is indicated. This should be injected into the muscle and not into fatty tissue. If sows are quiet and permit the pigs to nurse but adequate milk flow does not develop, anterior pituitary extract or stilbesterol should be used." Some veterinarians inject the pituitary extract intravenously, using an ear vein for this purpose.

Each gilt and sow should be checked daily during the first two weeks after farrowing. The herd owner should be advised by his veterinarian to note whether the placenta comes away reasonably early after parturition and, later, if there is a persistent discharge from the vulva. He should note whether the sow is constipated, and observe whether the pigs are satisfied after nursing. He should also look for evidence of scouring or other digestive disturbance in the pigs. The owner should be advised that if any abnormal condition is noticed the chances of saving the litter will be definitely increased if he calls his veterinarian before symptoms develop and the pigs start dying. The breeding, gestation and farrowing periods are times when close cooperation between owner and veterinarian may mean the difference between a good or a poor crop of pigs.

(*Reference list on page* 190)

Myoclonia Congenita: A Disease Of Newborn Pigs*

H. C. H. KERNKAMP, D.V.M., M.S.,** St. Paul, Minnesota

MYOCLONIA congenita is a disease of baby pigs that is present at the time of birth, or develops within a few hours thereafter, and is characterized by repetitive clonic contractions of voluntary muscles. It runs a clinical course varying from two to eight or ten weeks and in a high proportion of the cases, terminates spontaneously in a complete recovery. The cause is not known. From its nature and occurrence, however, the exciting influence appears to be exerted on the central nervous system of the affected pig while still within the uterus.

Myoclonia congenita is not a common disease although from inquiries and reports it is not of rare occurrence. Wherever it does occur and especially when a greater proportion of the pigs in two or more litters are involved, it creates, as a rule, considerable anxiety on the part of the owner as to its cause and ultimate outcome.

The earliest report in the literature of the existence of this disease appears to be one by Kinsley[1] in 1922. He gave a short but clear description of it under the title "dancing pigs", because in some cases the muscle spasms were so violent and frequent that the feet were raised off the ground or floor in rapid succession. It occurred in pigs under four weeks of age. In 1932, Nissley[2] described a disease in newborn pigs that was characterized by convulsions of greater or lesser intensity. More than 50% of the pigs born to 39 sows in March and April on a farm in Pennsylvania started to shiver at birth and shivered continuously for the following two to three weeks. Nissley expresses his surprise at the way many of these pigs could retain a teat in their mouths long enough to nurse during the vigorous spasms they displayed. Throughout the gestation period the sows received a diet of grain and fresh garbage, which was considered a balanced ration and since three different males had sired litters containing affected pigs, the genetic influence was ruled out as a causal factor. Hughes and Hinman[3] in California, and Knilans[4] in Wisconsin, reported typical cases of myoclonia congenita using the term "trembling" as a descriptive title. Hughes and Hinman state that the disorder occurred in about 50% of the pigs in two litters and Knilans in about 40% of the pigs in seven litters. In both instances, the disease was present when the pigs were born or it developed soon after birth. Moreover, recovery occurred in both instances without medical intervention. According to Knilans, J. M. Fargo of the University of Wisconsin had observed a similar condition in a number of the pigs raised at the university in 1935. It was thought at that time to have resulted from the feeding of excessive amounts of skim milk—20 pounds per sow daily. They tried to reproduce the condition by feeding 30 pounds of skim milk per sow per day but no evidence of the disease could be observed.

From time to time in the past 15 years, myoclonia congenita has occurred in herds maintained by the University of Minnesota. During this period from 30 to 60 litters have been farrowed each year in each of six different herds. Some years have passed without a single case having occurred and never has it occurred in more than six litters in a herd in a single year. Thus the litter incidence in these herds has been low. The incidence within the litter has varied from two pigs of a litter to all the pigs in the litter. The clinical course of the disease has varied considerably. Some cases recovered in as short a time as three or four days, whereas others extended over a period of eight to ten weeks. The loss by death has been very small.

We have seen this disease on farms in different parts of Minnesota and have knowledge of its occurrence on others. In none of these cases did it appear that the dietary regime of the sows was at fault nor could any particular adverse criticism be leveled at the antepartum care and management they received.

Symptoms

The repetitive clonic contractions of voluntary muscles constitute the outstanding physical symptoms of this disease. The intensity of the contractures vary from slight tremors or twitches to violent convulsive spasms. The spasms are greatest when the pigs are awake and

*Paper No. 2547 Scientific Journal Series, Minnesota Agricultural Experiment Station.

**Division of Veterinary Medicine, University of Minnesota, St. Paul.

UNIVERSITY OF MINNESOTA LIBRARIES

moving about. They may be abolished or nearly so when the pigs are at rest or asleep. The voluntary muscles of the entire body appear to be involved in some cases whereas in others, it is limited more or less to certain muscle groups. From this it will be seen that the symptoms displayed by the affected individual depend upon such factors as the particular muscles or groups of muscles that are involved and upon the intensity of the involvement. For example, when muscles that control the movements of the pelvic limbs are involved and the intensity of involvement is great, the symptom is expressed in uncontrolled movements whereby the hind parts of the body are raised and lowered in a jerking fashion and/or swayed from side to side precluding the ability of a normal stride. Likewise, up and down and/or side to side movements of the head and neck may be so violent as to interfere with prehending food. At the other extreme, the tremors may be slight and in no way interfere with the conditions and circumstances in which the pig finds itself. In this connection, the normal growth and development is seldom interrupted in cases with clonus that approach the extreme.

For the most part, a favorable prognosis can be made in this disease since recovery occurs spontaneously. In very mild cases, recovery ofttimes occurs within three or four days of its onset while in the more severe cases the pigs will not be without symptoms for a month or more. For those that succumb while exhibiting the disease, the cause of death seems to be related to starvation and exhaustion.

The clonic muscle spasms which characterize the physical symptoms of this disease, together with the fact that it is present at the time of birth or develops soon afterward, is the basis for designating myoclonia congenita.

REFERENCES

1. Kinsley, A. T., Dancing Pigs? *Vet. Med.*, 17:123 (Mar.), 1922.
2. Nissley, S. M., Shivers in Pigs. *Jour. Am. Vet. Med. Assn.*, 81:551 (Oct.), 1932.
3. Hughes, E. H. and Hinman R., Trembling in Pigs. *Jour. Am. Vet. Med. Assn.*, 42:96-97 (July), 1936.
4. Knilans, A. J., Tremblings in Pigs. *Jour. Am. Vet. Med. Assn.*, 42:590-591 (Nov.), 1936.

Hypoglycemia in Baby Pigs

(*Continued from page* 188)

REFERENCES

1. Dukes, H. H., The Physiology of Domestic Animals, ed. 6, Ithaca, N. Y., Comstock Publishing Co., 1947.
2. Graham, R., Sampson, J. and Hester, H. R., Studies on Baby Pig Mortality. I. Acute Hypoglycemia in Newly Born Pigs. *Proc. Soc. Exp. Biol. and Med.*, 47:338, 1941.
3. Hanawalt, V. M. and Sampson, J., Studies on Baby Pig Mortality. IV. Chemistry of the Blood during Fasting and Refeeding of Weanling Pigs. *Am. Jour. Vet. Res.*, 8:73, 1947.
4. Hanawalt, V. M. and Sampson, J., Studies on Baby Pig Mortality. V. Relationship between Age and Time of Onset of Acute Hypoglycemia in Fasting Newborn Pigs. *Am. Jour. Vet. Res.*, 8:235, 1947.
5. Morrill, C. C., A Physiopathological Study of the Newborn Pig with Special Reference to Hypoglycemia. Abst. of Ph.D. Thesis, University of Illinois, 1946.
6. Pinkerton, H. E., Swine Diseases. *The Allied Vet.*, pages 18-19, 1947.
7. Sampson, J., Hester, H. R., and Graham R., Studies on Baby-Pig Mortality. II. Further Observations on Acute Hypoglycemia in Newly Born Pigs (so-called Baby-Pig Disease). *Jour. Am. Vet. Med. Assn.*, 100:33, 1942.
8. Sampson, J. and Graham, R., Studies on Baby Pig Mortality. III. A Note on Experimental Insulin Hypoglycemia in the Pig. *Jour. Am. Vet. Med. Assn.*, 102:176, 1943.
9. Sampson, J., The Significance of Hypoglycemia. *Jour. Am. Vet. Med. Assn.*, 112:350, 1948.
10. Wiggers, C. J., Physiology in Health and Disease, ed. 5, Philadelphia, Pa., Lea and Febiger, 1949.

The Use Of Vaginal Suppositories In Veterinary Practice

J. DAVID SCHAFFER, B.S., D.V.M., Paoli, Pennsylvania

PRACTITIONERS frequently have found intravaginal medicaments to be the most direct means of therapy in gynecologic pathogenicities. More specifically, there are conditions of the uterus, cervix, and vagina that are constantly being presented for treatment; further, and not to be overlooked, the matter of contraception when pregnancy is undesired is a common problem referred to practitioners by dog owners.

In the past, veterinarians have been somewhat limited in choice regarding available medication for genital insertion. Generally the reliance has been upon such powders as iodoform, sodium perborate, the sulfonamides, chlorine derivatives, or a combination of these. The medicinal potion has been given as a douche or capsule. It is possible that various disinfectants of the cresol and permanganate groups in solution have been employed. It is the purpose of this report to set forth clinical results that followed intravaginal administration of soluble suppositories. Those used are known as lorophyn and furacin suppositories, respectively*. Lorophyn is a contraceptive spermicide with barrier properties. Furacin is the new and widely accepted antibacterial agent, employed for the first time in veterinary medicine in suppository form. For convenience, the properties of each and case citations will appear under two separate groupings.

A Contraceptive for Small Animals

Pregnancy is frequently undesirable, either from a medical standpoint or a circumstantial one involving the wishes of the client. When the writer is called upon to advise or prescribe a method of contraception which is non-toxic, efficient, and possessing no obnoxious odor, lorophyn has been the suppository of choice.

Properties of Lorophyn Suppositories

The active ingredient of this suppository is phenylmercuric acetate. The acetate and the corresponding nitrate are the most powerful spermicides known[1]. *In vitro* the acetate is most active at the acid reaction found in the vagina. It is capable of killing spermatozoa within 30 minutes at the low dilution of .001% in saline[2].

It was found further that lorophyn jelly in dilution of 1:10 was spermicidal in one minute of exposure[3]. Baker, *et al.*, in repeated trials, showed that in concentrations of very high spermicidal activity this acetate was harmless to the vagina and cervix of the bitch treated with estrone to bring the vaginal epithelium into a condition comparable to that of human beings. Similar non-toxic, nonirritating results were noted in rabbits following daily insertions for five days a week for ten weeks continuously. Urinary mercury excretion of 14 women using lorophyn jelly routinely for six months was determined to be less than 3% of the mercury content of the jelly, and less than one-tenth the amount of mercury excreted during routine mercurial therapy of syphilis[4].

To enhance client acceptability and for ease of insertion, lorophyn jelly is compressed into a suppository. Further, it is individually wrapped in foil and hermetically sealed. In warm climates the foil-wrapped suppository need only be dropped into cold water to harden for insertion. The vehicle of the medicament is a mixture of synthetic wax and glyceride which liquefies within 15 minutes at body temperature. This liquid has a low surface tension, spreads easily, and penetrates small crevices. On the cervix it is highly cohesive and clings tenaciously, forming a strong seal which remains for eight to ten hours. The monoglyceride, glyceryl laurate, employed in the base is non-toxic when ingested, being utilized like natural fat. Specialists in the field of human medicine are placing notable emphasis on their preference for the phenylmercuric acetate suppository over other means and devices[5].

In order to determine efficiency on a control basis, the writer exposed two normal fertile bitches in heat to male dogs known to be proved sires. This exposure was maintained daily during the seven days considered the period of ovulation. The bitches were protected by one lorophyn suppository inserted every ten hours. No conception resulted in either

*The lorophyn and furacin suppositories used were supplied by Eaton Laboratories, Norwich, N. Y.

animal. Similar findings were reported by three clients to whom these suppositories were dispensed for bitches that were not confined. Further, it was the report of these clients, as well as this writer's own observation, that the odor of discharge was minimized sufficiently to discourage the ardor of the male. This action no doubt was due to the impervious coating provided by the tenacious ingredients of the liquefied suppository.

The Treatment and Prophylaxis of Septic Female Genitalia

Furacin suppositories exhibit all the known properties of the drug in its fluid and ointment vehicles. Furacin is a nitrofurozone found to have marked and unusual bacteriostatic action. It was widely employed during the recent war among the wounded of many nations and may prove to be one of the greatest medical advances in the past 15 years. In the veterinary field much work has already been done. As a surgical dressing. DeCamp found it unexcelled[6]. Its versatility is commended by Kaplan[7].

Properties of Furacin

Furacin is synthesized from the pentose sugars of corn cobs. This nitrofurozone is specifically, 5-nitro-2-furaldehyde semicarbazone. It is readily soluble in water, alcohol, and glycols. It is antiseptic at low concentration and effective against most of the gram-positive and gram-negative bacteria. It is relatively non-toxic either by absorption or ingestion. It has proved ideal in wounds of all descriptions, both human and animal[8]. Sensitivity to this drug is rare. In man, 15 patients were patch-tested with furacin soluble dressing, and two other modern topical antibacterial agents. None of these showed ill effects from it, whereas 11 manifested definite reactions to the two other agents[9]. In the writer's personal experience the use of furacin in all its forms has never been followed by allergic reactions in animals.

Clinical Citations

The types of conditions treated and the results are briefly summarized as follows:

Retained Placenta (*Bovine*) (*Ten Cases*): As a prophylactic measure following professional aid at the time of parturition, two suppositories of furacin were placed into each horn of the uterus. In none of the ten animals treated was it necessary to return due to metritis or retention of afterbirth. These results may be compared to previous methods of treatment employing a capsule which contained iodoform, sodium perborate, and sodium bicarbonate. Of ten cows so treated, one developed metritis in spite of the precautionary measure, and two required further manual removal of placenta three days after calving. (This has been the average experience.)

Retained Placenta (*Canine*) (*Ten Cases*): As a prophylaxis, one or two furacin suppositories, depending on size of the bitch, were inserted well beyond the cervix as soon after passage of the final pup as possible. In all ten instances, no further scraping nor manual removal of placenta was required.

Metritis (*Canine*) (*Five Cases*): One suppository of furacin inserted each morning and evening until odor and discharge ceased (usually on the fourth day) resulted in recovery. In only one of these bitches was supportive treatment employed. This was an acute case, for which 300,000 units penicillin G were given as supportive treatment.

Metritis (*Feline*) (*Three Cases*): One suppository of furacin inserted each morning and evening without supportive treatment accomplished the desired results in four days.

Cesarean Section (*Canine*) (*Three Cases*): As a prophylactic measure, one furacin suppository was placed in each horn of the uterus after the removal of the pups. (It is the practice of this writer not to remove normal placenta in cesarean delivery of any fetus not having undergone decay, but rather to allow natural detachment and outward passage.)

Abscessed Anal Glands (*Canine*) (*Five Cases*): One furacin suppository inserted into the site of abscess and held in position by one suture, renewed once daily for four or five days, effected recovery..

Vaginitis (*Canine*) (*Ten Cases*): One furacin suppository each morning and evening for two days has been found extremely effective in this common occurrence to bitches of all ages.

Mammary Tumors (*Canine*) (*Five Cases*): Following surgical removal of common mammary tumors, it has been found that one furacin suppository implanted in the wound prior to suturing is a convenient form of a dependable bactericide, responsible for a minimum amount of adhesions, with little additional care required other than an occasional wet dressing cleansing of the suture site.

Conclusion

There should be no doubt as to the dependence veterinarians must place upon medicaments in suppository form. Further, the posses-

sion of a safe, efficient contraceptive has a definite place in the armamentarium of the progressive practitioner. Lorophyn contraceptive suppositories have been set forth as the medicament of choice. In the treatment of septic infection of the genital tract of female animals, as well as in the prevention of these occurrences, furacin in its suppository form has been found to produce the same satisfactory result as does the drug in fluid form accepted for topical application.

REFERENCES

1. Baker, J. R., Ranson, R. M. and Tynen, J., A New Chemical Contraceptive. *Lancet*, 882:38.

2. Baker, *et al., loc. cit.*

3. Eastman, N. J., and Scott, A. B., Phenylmercuric Acetate as a Contraceptive. *Human Fert.*, 9:33, 1944.

4. Sollman, T., Schreiber, N. E., and Cole, H. N., Excretion of Mercury after Clinical Intramuscular and Intravenous Injections. *Arch. Derm. and Syph.*, 32:1, 1935.

5. Eastman, N. J., and Seibels, R. E., Efficacy of the Suppository and Jelly alone as Contraceptive Agents. *Jour. Am. Med. Assn.*, 139:16 (Jan. 1), 1949.

6. DeCamp, C. E., A New Antibacterial Surgical Dressing. *Jour. Am. Vet. Med. Assn.*, 114:6 (Jan), 1949.

7. Kaplan, A., The Treatment of Superficial Infections of Small Animals with a New Antibacterial Agent. *Vet. Med.*, 43:118 (Mar.), 1948.

8. DeCamp, *op. cit.;* Kaplan, *op. cit.*

9. Shipley, E. R. and Dodd, M. C., Clinical Observations on Furacin Soluble Dressing in the Treatment of Surface Infection, *Gynec. and Obst.*, 84:366, 1947.

Clinical Diagnosis And Treatment Of Canine Leptospirosis*

R. E. WITTER, D.V.M., M.S., Urbana, Illinois

THE apparent annual increase in the incidence of leptospirosis is characteristic of the discovery of a new disease. The large number of published articles about leptospirosis which have appeared during the last ten years has made us more conscious of its existence and more familiar with the clinical symptoms. Doubtless the increased migration of people and their pets during the war caused more epizootics to appear throughout the United States. This factor, together with our advancing knowledge of the disease, is directly responsible for the increased number of leptospiral infections.

The wide variance of symptoms and imperfect laboratory procedures make many of us hesitant to diagnose cases of leptospirosis. An early diagnosis is essential, and proper treatment must be started immediately if the mortality rate is to be reduced. The clinician must, therefore, place faith in his judgment, diagnose this disease from the symptoms when the dog is first examined, and commence immediate treatment.

The symptoms of leptospirosis can be divided into septicemic, which are apparent during the first week of illness; and toxemic, or those symptoms seen in the later stages of the disease. It must be remembered that the severity of infection varies from acute cases, with death occurring within 18 hours after onset of symptoms, to subclinical cases, which are more difficult to diagnose due to lack of apparent illness. Additional diagnostic difficulty is met in the sporadic cases of leptospirosis, since the guard is likely to be lowered and watch kept for epizootics only. Fortunately, it has been learned that jaundice does not have to occur before diagnosis is possible. Jaundice may be present in only 3% and up to 50% of the cases seen during an epizootic.

Patients examined in the septicemic stage show dullness, with occasional muscular tremors, stiffness in the hindquarters and a tucked-up appearance, as Colonel Randall describes it. Appetite is usually poor or absent. Conjunctival and oral mucous membranes show a toxic or muddy congestion, with petechia of the buccal membranes, pharynx and epiglottis. The temperature is usually between 103.5 F. and 106 F. There is a frequent history of coughing, or a cough may be easily induced. Palpation over the kidneys is always painful if the dog has leptospirosis. The owner frequently thinks his dog is constipated, and an enema will bring forth an abundance of yellowish-orange colored feces that are putty-like in consistency. Further irrigation of the

*Presented at Missouri Veterinary Medical Association Meeting, St. Louis, June 6-7, 1949.

intestines will cause bile-stained water to be expelled. An enema is of considerable aid in reaching a diagnosis. Emesis rarely occurs during the first four days of the disease. Septicemic symptoms last from two to seven days before evidence of toxemia is noted.

In the toxic stage, the temperature is usually normal or subnormal. The symptoms seen in the septicemic stage are more pronounced. The areas of petechia have become blanched areas of beginning necrosis or have progressed to ulceration. Mucous membranes show more congestion or may be icteric, and the gum margins bleed when touched. Occasionally the tongue becomes necrotic and sloughs. Appetite is absent, and bile-stained vomitus is common. Diarrhea, with considerable bile in the feces, is usually present, or if seen in the terminal stage, the feces will contain free blood. Rapid dehydration and emaciation result from this gastroenteritis. The typical fetid, ammoniacal breath of uremic poisoning is very apparent. Uremia, which results from kidney damage caused by the Leptospira, is the cause of death in the majority of cases. A few very acute cases die in the septicemic stage as a result of profuse tissue hemorrhages and red cell destruction. *Leptospira icterohemorrhagiae* is the type infection seen invariably in these acute cases.

The differential diagnosis of leptospirosis from distemper, primary hepatitis and nephritis, rheumatism and other toxemic diseases is frequently difficult. It requires a careful and thorough examination of the patient, its history and habits. A positive diagnosis can be made only by laboratory methods. During septicemia, Leptospira can be found in the circulating blood by darkfield microscopy. This technic is the earliest positive confirmation available. The organisms usually disappear from the blood near the end of the first week of illness, when they begin to be evident in the urine. Antibodies do not appear in the blood until the tenth or twelfth day after the onset. These can be detected by use of the agglutination test or by the more accurate lysin-agglutination test. A complement-fixation test is now being developed which may be more reliable than those used previously.

Cultural methods and animal inoculations are unreliable due to the difficulty of successfully transferring Leptospira from the host to artificial media and laboratory animals. Cultivation in chick embryos has been highly successful. Embryos are harvested after six days of incubation and the fluids examined by darkfield microscopy. Blood counts may show a leukocytosis, but frequently this does not occur. A neutrophilia and an increased sedimentation rate are consistently found, however. Although an increased sedimentation rate is found in other diseases, it is probably the earliest change in the blood picture in leptospirosis, and the rate of its decrease can be utilized as a prognostic aid. Monlux found that freezing lowers the vitality and frequently kills Leptospira within 48 hours. This finding would indicate that tissues sent to commercial laboratories by practitioners should not be packed in dry ice if Leptospira are expected to be isolated.

Dogs in the septicemic stage of leptospirosis usually show a rapid response to penicillin therapy. It has been observed that the aqueous suspensions of procaine penicillin are more satisfactory than procaine penicillin in oil with aluminum monostearate. Although the latter gives a more prolonged action, it does not give as high a concentration in the blood as does the former. Very acute cases are best treated with penicillin G in saline every four hours for two days before using the aqueous suspension of procaine penicillin. Many of these early cases will appear to show recovery within 24 hours; however, unless penicillin is continued for at least five days, a relapse will generally occur in about a week. The dosage has been from 450,000 to 600,000 units a day for the first two days, followed by 300,000 units daily for at least three more days.

Recently Brunner, *et al.*, demonstrated that penicillin alone apparently eliminates the clinical symptoms but does not stop the elimination of Leptospira in the urine. They also found that streptomycin in oil and wax used in the dosage of 40 milligrams per kilogram per day for three to five days would eliminate the organisms from the urine. The author has found that Leptospira will not appear in the urine of those dogs receiving early treatment and will disappear from the urine of advanced cases within four days after treatment is started, if five to ten grains of methenamine is administered orally twice a day when penicillin therapy is begun. The methenamine is continued for at least three weeks or until the kidneys are no longer tender when palpated.

Supportive treatment is an important adjunct to the previously mentioned therapy, if one expects to have success in the treatment of leptospirosis. Fluids administered in the form of 5% dextrose in physiological saline, Ringer's solution, gelatin, and protein hydrolysates are

necessary to combat dehydration. One or two blood transfusions when used with these fluids will give superior results. Frequent enemata with 5% sodium bicarbonate solution will remove the irritant materials from the intestines and decrease intestinal ulceration. Injectable crude liver and thiamine hydrochloride will supply the necessary vitamins to offset anemia and improve the appetite. During convalescence, a high protein diet of meat and cottage cheese, with iron and arsenic tonics, hastens recovery. Respiratory complications similar to those seen in distemper frequently appear. These respond favorably to homologous antibacterial sera and sulfamerazine. Liver damage usually occurs, and bile salts tablets are used to alleviate this complication.

The fact that both *Leptospira icterohemorrhagiae* and *Leptospira canicola* are infectious to man must not be overlooked. Fortunately about 90% of the leptospirosis observed in dogs is caused by *L. canicola,* which produces less severe symptoms in human beings. Personal conversations with numerous physicians have revealed their feeling that many Leptospira infections are possibly being missed by physicians, since most descriptions of Weil's disease in man emphasize jaundice as an early symptom. The Illinois Health Department now requests all veterinarians to submit a monthly report of all cases of leptospirosis, as well as other diseases infectious from animal to man. These reports are tabulated and included in their monthly bulletin, which is sent to all physicians and veterinarians in the state. This type of cooperation and publicity will aid materially in the control of the disease and should be stimulated in all states.

Tactful publicity during an epizootic of leptospirosis will alert dog owners that the disease is in the community. They will thus consult professional advice while the animals are in the septicemic stage, greatly reducing the mortality rate. Rat eradication, closer confinement of dogs, and elimination of strays, together with proper diagnosis and treatment of this disease to eliminate carriers, will assist in shortening the duration of an outbreak.

REFERENCES

1. Brunner, T. K., Canine Leptospirosis. *N. Am. Vet.,* 30:517 (Aug.), 1949.

2. Monlux, W. S., Leptospirosis. *Cornell Vet.,* 38:57, 1948.

3. *Idem.,* Leptospirosis. *Cornell Vet.,* 38:109, 1948.

4. Randall, Raymond, Canine Leptospirosis. Paper presented before The Veterinary Medical Association of New York City, Inc., May 4, 1949.

5. Randall, Raymond, D.V.M., Wetmore, Psyche W., B.A., and Warner, Albert R., Jr., Sonic-vibrated Leptospirae as Antigens in the Complement Fixation Test for the Diagnosis of Leptospirosis. *Jour. Lab and Clin. Med.,* 34:1411 (Oct.), 1949. Abs. *Vet. Med.,* 45:136 (Mar.), 1950.

▼ ▼ ▼

Development of Helminthiasis

(*Continued from page* 186)

present in yearlings. The ultimate source of strongyle infection for newborn foals was the concurrent infections of their own dams.

Control and prevention of worm infections in foals was found to be absolutely dependent upon efficient and timely use of anthelmintics. Most efficient ascaris control was accomplished by a series of therapeutic treatments with carbon bisulfide, the first treatment being timed to coincide as closely as possible with the first maturity of parasites. A system of low-level phenothiazine therapy, which prevented mares from sustaining seasonal increase of worm burdens, resulted in pastures freer of contamination with infective worm stages and consequent prevention of heavy infection of foals.

REFERENCES

1. Russell, A. F., The Development of Helminthiasis in Thoroughbred Foals. *Jour. Comp. Path. and Therap.,* 58:107, 1948.

2. Todd, A. C., Hull, F. E., Kelley, G. W., Wyant, Z. N., and Hansen, M. F., Worm Parasites in Thoroughbred Mares. Ky. Agr. Exp. Sta. Bul. (In press.)

3. Todd, A. C., Kelley, G. W., Wyant, Z. N., Hansen, M. F., and Hull, F. E., Worm Parasites in Thoroughbred Sucklings and Weanlings. Ky. Agr. Exp. Sta. Bul. (In press).

4. Todd, A. C., Hansen, M. F., Kelley, G. W., and Wyant, Z. N., Continuous Phenothiazine Therapy for Horses. Part I. Effect on the Worm Parasite. *Vet. Med.,* 44:411 (Oct.), 1949; Part II. Hematological Studies with a Note on Postmortem Findings. *Vet. Med.,* 44:461 (Nov.), 1949.

5. Dimock, W. W., The Two-Gram Daily Dose of Phenothiazine for Strongylosis. *Vet. Med.,* 44:99 (Mar.), 1949.

▼ ▼ ▼

Yellow fat covering in beef carcasses has long been considered less desirable than white fat because of the association of such coloring with carcasses of older animals and dairy cows. Yellow fat is common in carcasses of young beef fattened on pasture, the color is indicative of storage carotenoids some of which are useful as protection from vitamin A deficiency.

PRINCIPLES OF ANIMAL HEALTH

R. R. DYKSTRA, D.V.M.
Manhattan, Kansas

In Latin America, cattle, in addition to being infested with ticks, have as an external parasite the "berne." Technically it is the mature larva, after two preliminary molts, of the *Dermatobia hominis*, sometimes known as *Dermatobia cyaniventris*. It is the tropical warble fly. The eggs are deposited on the abdomens of mosquitoes, occasionally on flies and ticks, and when these feed on mammals the eggs hatch. The resulting larvae penetrate the skin in about 30 minutes to lodge in the subcutaneous tissues, there to undergo additional molting, terminating in the berne. The remaining life history is very similar to that of the ox-warble in the United States. If a hide has as many as five berne holes it is graded no. 2 which is worth one cent a pound less than grade no. 1, and if there are many grub holes the hide is not considered to be worth tanning. Some hides have from 300 to 400 grub holes. Dips of benzene hexachloride (BHC) and also a commercial dip are reasonably effective in controlling the berne so that cattle are restored to a better state of nutrition. South American literature available to this writer makes no mention of the use of the derris wash that has been found to be effective in the handling of the ox-warble situation in the United States.

▼ ▼ ▼

Doctors Pounden and Hibbs, veterinarian and animal nutritionist respectively, Ohio Agricultural Experiment Station, report in *Hoard's Dairyman* of September 25, 1949, on Cud Inoculation for Calves. They advance the theory that in some instances calves are raised on such a high plane of sanitation, even to the extent of being removed from the dam immediately after their birth, that they have no opportunity to acquire the normal infusoria of the cattle rumen, and that therefore the fermentation processes are inhibited and health suffers. This potential ill-health they seek to prevent by removing small pieces of cud from the spaces between the tongue and teeth, and between the teeth and the cheeks, and administering this to calves, presumably at about the time they start to nibble at solid food, and repeated weekly until the rumen action is well established. The cuds must be derived from healthy animals. Also, it was found that the calves fed too much grain in proportion to roughage were not benefited as much as those which received a high proportion of good quality roughage—in the latter the cud inoculated calves really thrived.

▼ ▼ ▼

An aged farmer who has raised swine for more than 60 years wrote that all his pigs that were farrowed normally during January and February, died within a few hours, at about three weeks of age. The deaths were spread over a period of about a month. The only symptoms presented were some coughing, marked swelling of the throat, and death in less than 24 hours. No nearby veterinary service had been available. The swollen throats and the sudden deaths were in line with an outbreak of the so-called gloss-anthrax, probably more correctly edema of the glottis, observed by us many years ago. At any rate we advised the owner that in our opinion the condition was sufficiently grave to warrant an immediate veterinary investigation to be supplemented by laboratory methods.

▼ ▼ ▼

Just as a reminder, it is well to recall that a modified tuberculosis-accredited area is one in which there is less than one-half of one per cent of tuberculosis. On the other hand a modified brucellosis-free area is one in which there is less than 1% of brucellosis in the area with no more than 5% of the infection in any one herd.

▼ ▼ ▼

Under the caption, The Secret of the West North-Central States, the February 1950 issue of the *American Journal of Public Health* indicates that in 1940 the human death rate in the Dakotas, Nebraska, Iowa and Kansas was 16% below the rural rate of the country as a whole. A conclusion is that the determining factor for this low death rate seems to be the combined effect of good living standards and of rural life.

▼ ▼ ▼

From the 1949 Report of the Chief of the United States Bureau of Animal Industry, we learn that day-old chicks survived for at least 12 hours under conditions comparable to those found at an altitude of 20,000 feet. At 25,000 feet there were some deaths. This is of importance in the shipment of chicks by air.

Management Of Sheep On Needlegrass Ranges To Reduce Mechanical Injury

VERNON A. YOUNG*, College Station, Texas

SHEEP, since their early introduction on the American continent, have suffered from mechanical injury by the sharp pointed seeds of two large grass genera, namely, Stipa and Aristida.

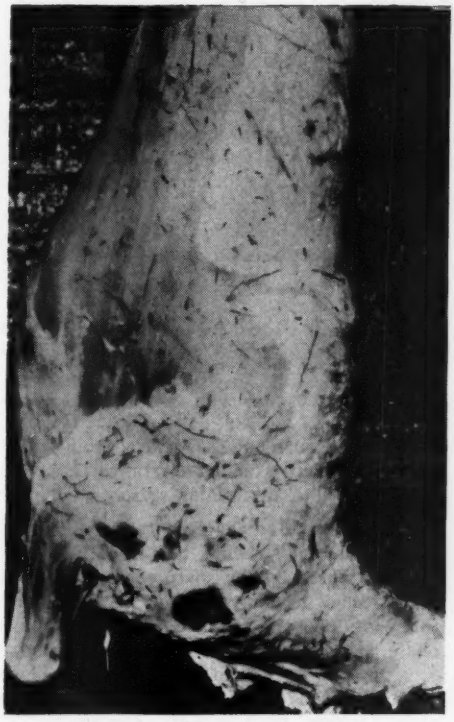
Such injuries have increased both in numbers and severity during the past 25 years. This has been due primarily to the increase of the so-called needle or spear grasses on huge acreage of overgrazed ranges in the United States and parts of Mexico and Canada. Often the seeds have so deeply penetrated the flesh of sheep (Figure 1), as to impair large portions or small localized parts of the carcass for eatable purposes and require such trimming as to substantially reduce the market value.

As sheep graze among the needlegrass plants, the mature seeds not only become attached to the wool but sometimes work into the skin and flesh. At other times these seeds invade the ear canals, eyes, nose and tissues of the mouth and tongue. The attachment of a large number of seeds may impair the animal's vision and appetite, resulting in weight loss. Because of the skin punctures made by needlegrass seeds, sheep may suffer from screwworm infestations. Such cases usually require treatment and even though the infection may be controlled, the animals lose considerable weight and are somewhat of a liability on the range for some time. Even the noninfested skin punctures cause much damage to the pelts of the sheep which lower their market value.

Since some of the above difficulties may be wholly or partially corrected by the introduction and adoption of certain range management practices, it is the object of this paper to set forth briefly a plan or system to alleviate the problem. Before attempting to explain how such a system might be successfully employed on the ranges, it would seem desirable to point out some major characteristics that will readily distinguish the needle or spear grasses of the genus Stipa from the three-awn or needlegrasses of the genus Aristida.

*Department of Range and Forestry, A. & M. College of Texas.

The seed of the Stipa grasses may be distinguished by the long, single needle-like awn which is twisted, bent and the sharp base which may be covered with stiff short hairs.



—Photo courtesy of Ray Cuff, Regional Director, National Livestock Loss Prevention Board.

Fig. 1. Needlegrass damage in sheep carcasses that necessitates extensive trimming. Keep sheep away from needlegrass.

The seed of Aristida grasses are usually distinguished by three awns at the tip of the seed, which is slender and cylindrical with a sharp-pointed, somewhat hairy, base. (Figure 2.)

The Stipa grasses are chiefly perennial bunchgrasses and are widely distributed over the range lands of the United States and certain portions of Canada and Mexico. Their altitudinal range varies from sea level in California to about timber line in the Rockies.

The Aristida grasses, which include both annual and perennial species, are widely distributed throughout the western and southwestern regions of the United States. They grow principally on dry sandy soils and are thus well adapted to the semidesert areas, plains and lower elevations of the mountains. The annual species are commonly known as poverty grasses because they invade overgrazed ranges, have a short growing period, mature rapidly, dry up and practically disappear. The annuals do furnish some early succulent forage eagerly grazed by sheep. The perennial species, however, furnish some forage

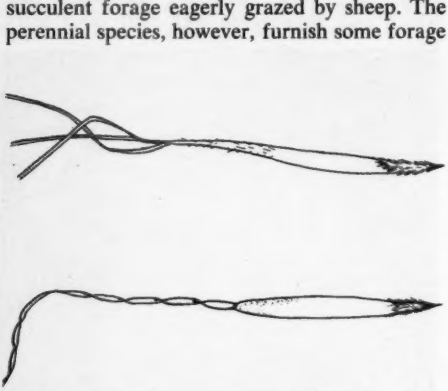


Fig. 2. Seed of three-awn grass, Aristida (upper); of needlegrass, Stipa (lower).

most of the year and *Aristida wrightii* which grows abundantly on certain ranges holds its seeds even into the winter season.

The suggested management system, which may substantially reduce the injuries and infections caused by the sharp seeds of both of the so-called needlegrass genera, has the two following phases: First, is the open range phase, which supports primarily perennial Stipa grasses or mixed Stipa and three-awn Aristida grasses. Second, is the fenced native phase, which may include principally the three-awn grasses or mixed three-awn and needlegrass composition.

The first phase would involve a herding deferred rotation system of management whereby certain areas of a given range would be grazed at different periods of the year to obtain best utilization and still avoid the seed development stage of the needlegrass species that are most injurious to sheep. This stage applies to the period when the seeds are in the late dough stage until they have practically all shattered or dropped from the plants. The number of rotations will naturally depend upon the topography of the range, the general composition of the vegetation, water facilities, and the abundance of a particular Stipa or Aristida species, as well as the duration of the general grazing period.

For example, a range which can be divided into four areas for deferred-rotation grazing might be handled as follows: Spring grazing should begin on area no. 1 when the vegetation is sufficiently developed for safe early utilization. When the key grasses (most palatable and abundant species), have been properly utilized the sheep should be moved to area no. 2 and later to area no. 3, keeping in mind that each area must not be overgrazed. If at the time area no. 3 should be relieved of grazing the Stipa seeds in area no. 4 are not sufficiently shattered to prevent injury to the sheep, it would be advisable to move the sheep into area no. 1, and later to area no. 4. However, it might even be necessary to return to area no. 2 before grazing area no. 4 in order to utilize the forage plants before they lose much of their nutritional value.

After seed-shattering has occurred in area no. 4, a high percentage of the nutritional value of the grasses is lost and the forage may be utilized somewhat heavier than in areas 1, 2 and 3 because the plants have been able to store more reserve food in their roots. However, a stubble of two or more inches in height should remain on the ground when the area is relieved of grazing. Under a year-long grazing system, the order of area utilization can be determined if careful consideration is given to all the localized environmental and economical factors.

The second phase of management calls also for a rotation or deferred rotation system with the use of divisional fences and desirable water facilities for sheep. Either system is quite well suited to such regions as the Southwest, and the plains, as well as certain localized areas of the general range country where most of the sheep range lands are fenced. Texas is an unusual example of a huge area under fence supporting many needlegrasses and millions of sheep and goats. During certain years, needlegrasses cause considerable monetary loss to sheepmen from death of sheep, reduced sale values of affected animals, and infested wool.

The exact order of grazing the fenced units of a given sheep ranch will depend largely upon the abundance of either or both of the annual and perennial three-awn (Aristida) and needlegrasses (Stipa) present, in relation to

(*Continued on page* 201)

The Treatment Of Chronic Bovine Mastitis With Aureomycin

R. A. PACKER*, D.V.M., Ph.D., Ames, Iowa

DURING recent years, several agents, especially the antibiotics, have been found quite effective in treating chronic streptococcic mastitis. However, the value of these same drugs in cases of staphylococcic infection has not been as great, and the search for a more efficient antibiotic for this condition has continued.

The discovery of aureomycin[1] and its subsequent development have shown it to be effective against staphylococci and streptococci, as well as other infectious agents. This fact has led to tests of its usefulness in the treatment of bovine mastitis. These reports[2, 3] indicate that aureomycin will become a useful drug in the treatment of udder infections.

This paper reports the results of aureomycin administration into 91 infected quarters, a majority of which were chronic staphylococcic infections.

Methods and Materials

Except for one cow, the cases treated were confined to two herds. Herd A is comprised of purebred Guernseys with approximately 20 head being milked. Husbandry and sanitation in milking are considerably above average. Herd B is the Iowa State College dairy herd composed of all of the common breeds, Holsteins predominating. Management of milking is excellent so that there are few possibilities for immediate reinfection after treatment of infected quarters.

Diagnosis of infection was based on the isolation and cultural identification of the organism, pH and catalase tests. With few exceptions, the diagnosis was determined by two examinations a few days apart.

Aureomycin hydrochloride**, used in this study, was incorporated in an ointment base and was dispensed in collapsible tubes. Each tube contained approximately 200 mg. of aureomycin in 7.5 gm. of ointment. The aureomycin was injected from the tube into the udder through the teat canal immediately after the regular milking period. Three cows, eight quarters, were treated while dry; the remainder were in lactation.

TABLE 1—EFFECT OF AUREOMYCIN ON STAPHYLOCOCCIC MASTITIS.

	Organism	No. of Qrts. Trt.	No. of Inj. per Trt.	Dose of Aureomycin per Inj. (mg.)	Hrs. Betw. Injections	Qrts. Neg. After Trt.	% of Qrts. Neg. after Treatment
Herd A	*Staph. aureus*	39	1	200	....	11	28.2
	Repeat on above	23	2	400	48	14	60.9
	Summary	42				25	59.5
Herd B	*Staph. aureus*	28	1	200	....	13	46.4
	Repeat on above	5	2	200	24	4	80.0
	Staph. aureus	4	2	200	24	4	100.0
	Summary	32				21	65.6
Cow C	*Staph. aureus*	3	1	200	....	0	0
	Repeat	3	2	200	24	1	33.3
	Repeat	2	2	400	48	1	50.0

Milk samples were drawn at various intervals after treatment to determine the effectiveness of the agent. The shortest period of observation after treatment was 16 days and the longest 84 days. In Herd A, the treated quarters of some cows were examined only once after treatment but many were checked three times over a period of 24 to 84 days. In Herd B, two to nine examinations of each treated quarter were made following treatment except in those cases in which the organism was found to persist on the first test after treatment.

Results

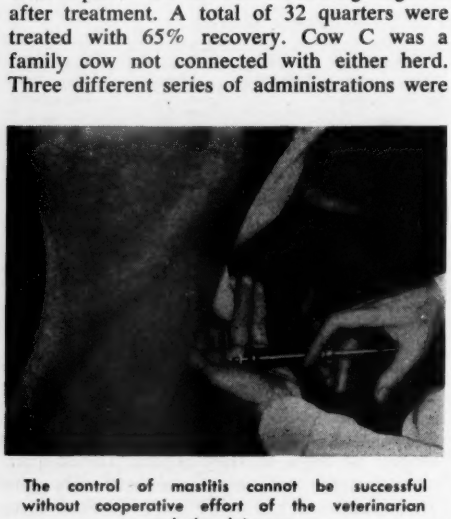
The results of aureomycin treatment of staphylococcic mastitis are summarized in table 1.

*Department of Veterinary Hygiene, Iowa State College.

**Furnished through the courtesy of American Cyanamid Company.

A total of 42 different quarters were treated in Herd A. Thirty-nine of these were treated once with 200 mg. of aureomycin. Eleven were free of infection during the period of observation after treatment. Several more were negative upon the first examination one week after treatment, but the organisms reappeared on the second or third examination post-treatment.

In Herd B, 28 quarters with Staphylococcus infection were given one 200 mg. dose with 13 of them responding. Five quarters which remained infected after one dose were reinjected with two doses of 200 mg. at 24-hour intervals with four of these becoming free of infection. Four other quarters were treated twice, 24 hours apart, with all four becoming negative after treatment. A total of 32 quarters were treated with 65% recovery. Cow C was a family cow not connected with either herd. Three different series of administrations were made with response in two out of three infected quarters.



The control of mastitis cannot be successful without cooperative effort of the veterinarian and the dairyman.

The treatment of Streptococcus infections is summarized in table 2. The results on 12 quarters were quite favorable with all responding to a single 200 mg. dose of aureomycin.

Two quarters with acute mastitis produced by *Escherichia coli* were given a single dose of 200 mg. of aureomycin. Examinations of samples taken 24 hours later showed the organisms still present in considerable numbers. Furthermore, no clinical improvement in the quarter or the general condition of the cow was noted; the temperature remained at 105 F. The administration of streptomycin was followed by prompt improvement and complete recovery of both quarters.

The results of single versus multiple doses of aureomycin in Staphylococcus infection are shown in table 3. The results of treatments of the other types of infection also are listed for comparison. From these data it appears that multiple doses are indicated for satisfactory results in the treatment of mastitis produced by *Staph. aureus*. On the other hand, one 200 mg. dose was quite effective against the streptococcic cases treated.

TABLE 2—RESULTS OF AUREOMYCIN TREATMENT OF MASTITIS DUE TO STREPTOCOCCI AND *E. coli*.

	Organism	No. of Qrts. Trt.	No. of Inj. per Trt.	Dose of Aureomycin Per Inj. (mg.)	Qrts. Negative After trt.	% Qrts. Neg. After Trt.
Herd A	*Str. uberis*	5	1	200	5	100
Herd B	*Str. uberis*	6	1	200	6	100
	Str. dysgalactiae	1	1	200	1	100
	E. coli	2	1	200	0	0

TABLE 3—COMPARISON OF SINGLE VERSUS MULTIPLE TREATMENTS WITH AUREOMYCIN.

		No. of Qrts. Trt.	% Neg. After Trt.
Staph. aureus	Single 200 mg. dose	70	34.3
Staph. aureus	Multiple 200 mg. doses	35	68.5
Streptococci	Single 200 mg. dose	12	100.0
E. coli	Single 200 mg. dose	2	0

Discussion

The results presented above indicate that aureomycin has definite value in the treatment of both streptococcic and staphylococcic mastitis in the chronic stages. The experience with treating streptococcic infections is limited to a comparatively few cases and of these 11 of 12 were *Str. uberis* infections. Therefore, it is hazardous to draw any conclusions except that aureomycin looks very promising as a treatment of this type of infection. So far, there is no indication that more than one dose will be necessary for successful treatment of chronic *Str. uberis* infections.

A total of 77 different quarters infected with *Staph. aureus* were treated with aureomycin; 61.5% were negative following treatment. The response to a single dose of 200 mg. was 34.3%, 24 of 70 quarters so treated. By com-

parison, 35 quarters given two administrations showed 24 negative quarters after treatment; a 68.5% response. It may be pointed out that of these 35 quarters all but eight were those not responding to the first single dose of 200 mg. Reference to table 1 shows that 23 of the 35 quarters receiving two injections of aureomycin were given two 400 mg. doses 48 hours apart. Therefore, the increased efficiency may be due to two factors; (1) prolonging the level of aureomycin in the udder over a longer period and (2) increasing the amount of the drug per administration. Whether increased dosage or prolonging the level in the udder is more important was not determined. However, it was noted in those 12 quarters treated twice with 200 mg. doses instead of 400 mg., the efficiency was considerably better (75%) than a single 200 mg. injection (34.3%).

The best schedule of injections was not determined, since all but five quarters which were treated with two doses were injected at 48-hour intervals. Those five quarters were given injections 24 hours apart with four of the five showing negative tests after treatment. However, the result on only five tests is too small a number to reach any conclusion on this point.

The cases of *E. coli* infection treated were too few to warrant any conclusions on the value of aureomycin on this type of infection. Furthermore, the two acute cases which were treated were given only one dose of aureomycin. Since there was no clinical improvement and the organisms were found to persist during treatment, it was discontinued and streptomycin was given.

Conclusions

1. Aureomycin is of definite value in the treatment of chronic bovine mastitis.

2. All 12 cases of chronic streptococcic mastitis treated were negative following treatment.

3. Seventy quarters infected with *Staph. aureus* were given one 200 mg. dose with 34.3% success in eliminating this organism from the udder.

4. Thirty-five quarters were given two injections of aureomycin with the elimination of *Staph. aureus* from 68.5%.

5. No improvement was noted in the two cases of *E. coli* infection treated.

REFERENCES

1. Duggar, B. M., *et al.*, Aureomycin—A New Antibiotic. *Ann. N. Y. Acad. Sci.*, 51:175-342, 1948.
2. Easterbrooks, H. Lincoln, Intravenous Aureomycin Treatment in Acute Staphylococcic Mastitis. *Jour. Am. Vet. Med. Assn.*, 116:48-49, 1950.
3. McCulloch, E. C., Kiser, J. S., and Migaki, Hoyo, Aureomycin in the Treatment of Staphylococcic Mastitis in Cows. *Vet. Med.*, 44:253-258, 1949.

Acknowledgment

The author is indebted to Dr. M. J. Johnson for assistance in treating Herd A.

▼ ▼ ▼

Needlegrass Damage in Sheep

(*Continued from page* 198)

other species, such as broad leaf herbs and browse on the range. The system may be based upon year-long grazing in certain localities or for shorter periods in other areas.

Sheep ranges in Texas have been grazed continually since the early introduction of sheep in the state. Certain ranchmen have strongly emphasized the importance of any desirable grazing system that might protect their animals from the evils of needlegrass seeds. By and large, the rotation or deferred rotation system today seems the most desirable under a fenced system of grazing sheep. However, a cattle and sheep combination of livestock management may offer desirable advantages, but for space reasons this phase will not be discussed.

Regardless of the system used, if it is to be practical and economical, proper utilization of the forage species and especially the key species is paramount to a continuous and prosperous sheep industry. Thus, sheepmen must graze conservatively by basing the number of animals that a given area will support on the growth requirements of the key plants which will mean in most cases that 35 to 50% of their forage production must be left ungrazed.

▼ ▼ ▼

Dips containing a mixture of lime and sulfur, or nicotine sulfate only, are permitted for use in official dipping of cattle which are moved in interstate commerce. This is not an unfavorable reflection on the efficacy of benzene hexachloride and others of the newer insecticide preparations effective against cattle scabies. A field test to determine the strength of these vat solutions is necessary before official approval will be forthcoming.

▼ ▼ ▼

Overcrowding is an important factor responsible for outbreaks of respiratory infections in chickens.

Reflections Of A Veterinary Practitioner*

A. M. McDERMID, D.V.M., Middleton, Wisconsin

IN THIS day of high speed living, it is well that we occasionally pause to reflect. Where have we been and where are we going? It is with this thought in mind that I have chosen as my subject for the evening something a bit different from the usual line of discussion at a professional meeting. It is perhaps fortunate that one cannot predict the future. However, our actions and activities of the past and present must make us cognizant of the future.

One need not be so very old to have witnessed a considerable change in the practice of veterinary medicine. Being the son of a practitioner, my memory recalls the field of veterinary medicine for about 25 years. As a child I used to ride the logging trains into the woods on Saturdays with my father as he took care of floating horse's teeth, looking after cuts and bruises, sweenies, poll-evils, fistulous withers, spavins, ring bones, etc. Today, work horse practice is mostly a memory. Practically all of my present horse practice is confined to light riding horses, and that amounts to only about 8% of my gross business. The older men will recall when horses constituted the major source of income and cattle were a nuisance. Today the situation is reversed.

Many of us recall the 1930-1934 days when the government was purchasing cattle for $15. to $25. each. A veterinarian received $5.35 for his day's work, and was very glad to get it. Those were the days of bread lines, soup lines and relief. The Borden Company used to purchase the very best of our cattle for an average of $50. per head and ship them to New York. The cattle would be milked and salvaged. I used to get $75. for riding to New York with a carload of cattle, seeing that they were milked, fed and watered enroute. My $75. had dwindled to perhaps $10. to $15. by the time I paid for my food and transportation home. But this experience is one I shall always remember.

We have recently gone through another war. Many of the younger people in our profession and in every other line of endeavor have only memories of lush times, green pastures, government subsidies and cost-plus contracts. We have an economy purchased by a national indebtedness which in the past 20 years has increased from 16 billion dollars to over 257 billion dollars. Our system of government, as well as our daily lives and our mode of thinking, is gradually undergoing a change. Many of the younger professional men—physicians, dentists, and veterinarians, were educated at government expense. Even though they might rebel at the thought of socialized medicine, their recoil is less explosive than that of men a generation or two earlier. Gradually, over a period of years, the government has increased its scope and activities. Whether we realize it or not, we are all being engulfed in this new way of life.

The past ten years have seen the advent of some remarkable new drugs, such as penicillin, streptomycin and the various sulfonamide drugs. With the increased agricultural income, the drug stores, hatcheries, feed stores, patent medicine dispensers and the mineral salesmen have definitely come into the picture. Look at any of the agricultural magazines and papers and read of the medicine and "cures" for sale. Millions of dollars each year are being spent to bring these products constantly before the farmers. Ask any of the older men how much mastitis they treat today as compared with years gone by. Ask them how much hog mange oil and flea and louse powder they dispense as compared with a decade ago. Inquire as to how many hogs they have wormed lately. It is true that some of the newer treatments might be superior to the old—but who is handling them? In most instances it is not the veterinarian.

Perhaps because of the good economic conditions enjoyed by the members of our profession, we have been lulled into a false sense of security. It is true that we are still making a good living after having lost much of the business mentioned a moment ago. We have also been largely by-passed by the poultry and fur industries. These two industries represent over 100 million dollars income per year in Wisconsin alone. The general attitude taken by the veterinarian has been that he is either

*Address delivered at a joint meeting of the Southeastern Wisconsin Veterinary Medical Association and the Dane County Veterinary Medical Association, Madison, Wis., August 18, 1949.

too busy to participate in these agricultural pursuits or he is not interested because he knows nothing about them. The truth of the matter is that other groups have beaten us to the punch. We might say that we have been encroached upon as a result of our own neglect.

One answer to encroachment is ample veterinary service. This challenge is being met with the inauguration of seven new veterinary colleges. The demand for veterinary services is always geared to the economic condition of the country. So long as farm prices remain at a fairly high level, and I believe they will so long as the Marshall Plan and world recovery are utilizing our production, there will be a demand for our services. However, should our government cease being Santa Claus, our economic condition will materially regress. If this happens, what are all of the new veterinarians going to do? We have all but closed the door behind us in many of our allied professional pursuits. In this state (Wisconsin) the calfhood vaccination program has stimulated the formation of veterinary partnerships. Should this program lessen or be stopped, our hog, cattle and milk prices be further reduced, all of us will most certainly wish we had not lost ground to those not qualified by background or training to aid the livestock industry with its disease problems. With the advent of our new veterinary colleges, we all hope that the manpower required by state and federal livestock disease control programs will be met. If those jobs are not filled soon, the demand for action will most certainly require the employment of laymen. Experience has taught us that once the job has been lost to the profession, it is usually a permanent loss.

For the good of the profession and for agriculture as a whole, there should be greater cooperation between county agents, farm bureaus, granges and allied agricultural interests and the veterinary profession. I have heard veterinarians decry these groups many times. These groups far outnumber our profession and it would seem to me that much more could be accomplished for the good of agriculture if we took part in these activities rather than to oppose them. We can be so much more effective guiding these organizations than fighting them. Just remember, a group can be led where it cannot be pushed.

Professional ethics forbid us to advertise our capabilities. Millions of dollars are spent by commercial companies bringing their nostrums and salesmen constantly before the farmers. How can we ethically combat this growing trend? Certainly not by direct abusive rebuttal. Let me illustrate. Recently I was called by a good client of mine to treat a case of milk fever. As I drove into the farmyard, two mineral salesmen drove out. The farmer said he had been promised that if he bought their product he would have no further milk fever, mastitis, shy breeding, etc. The farmer asked me if he should buy their product. My answer was, "Yes, if the mineral company would sign a contract wherein it would pay for all veterinary services which applied to the conditions they guaranteed against. If the salesmen just offered talk and not contract. then the farmer could draw his own conclusions." The farmer got the point. If I had bombastically attacked the mineral product I doubt if much would have been accomplished.

Much of our advertising must of necessity come from veterinarians not in active practice. The state and federal regulatory officials, the university, the extension service and ethical commercial houses must do this for us. If practitioners get up in lay meetings and state that veterinarians should be called out to perform various veterinary services and that their advice be sought, they will be accused of beating the drum. However, other veterinarians, not in practice, can say the same things and accomplish a vast amount of good for agriculture and the veterinary profession. From the manner in which we, as a profession, are being by-passed, I would say that what we really need is a good press agent to acquaint the public-at-large with our capabilities and accomplishments. Surely, as our ranks increase, we must seek lines of endeavor other than practice. To lay the groundwork and promotional work for these jobs, industry and the public must be better educated than to think of us as "horse doctors." Although the latter connotation has a long and honorable history.

Great strides have been taken in the past 20 to 30 years to raise the opinion so many people have had of veterinarians. Each and every one of us is a committee of one in our own community to elevate this opinion. We should honor our chosen profession by living respectable lives, participating in civic affairs, attending the church of our preference, and being willing neighbors. No doubt those of us of my age have found a niche in society more easily and more acceptably than did our fathers. My son has indicated an interest in this profession and I should like to live so that he will have fewer obstacles to overcome than did those of my generation.

At the close of 1949, the Bureau of Animal Industry had on its rolls a total of 7,873 employees, of whom 1,958 were classified as professional and scientific. This increase in man power over that shown in report for 1948 is due principally to the employment of additional personnel for duty in connection with the cooperative foot-and-mouth disease eradication campaign being carried on in Mexico. The Bureau continues to experience a shortage of veterinarians.—Annual Report of the Chief, BAI.

Disinfectant Solution Dips for Hatching Eggs

To determine the effect of disinfectants on hatching eggs, poultry specialists of the Bureau of Animal Industry conducted tests with sodium hydroxide (2% solution), quaternary ammonium (0.1%), and sodium orthophenylphenate (1%). Eggs were immersed in one of these prepared solutions for five minutes. In none of these tests was there any noticeable effect on the hatchability.

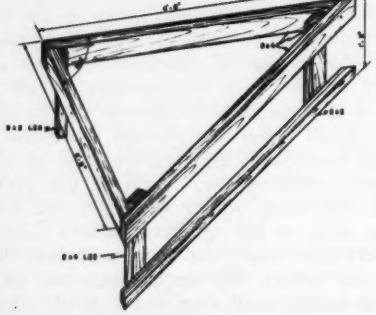
Electric Pig Brooder

Wide use of electric lamp-type pig brooders in all sections of the corn belt has proved their value by reducing losses in baby pigs during cold weather. A practical brooder, combining simplicity with low-cost construction, is depicted on this page as developed at the Oregon State College Agricultural Experiment Station, Corvallis, (Circular 135).

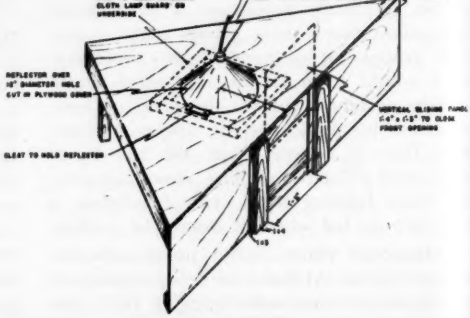
The hover fits in the corner of the farrowing pen extending four feet on each side of the triangle, and is framed in with 2″x4″ and 2″x2″ material. Height to top of framework is 1′3″. Top and front are covered with ½″ plywood; the top with a 12″ square opening for the lamp reflector, the front with a creep opening 1′2″ wide (see drawing). Protection from damage by the sow is provided by 2″x12″ planking secured in front and extending above the brooder.

A regular Mazda lamp, 100 or 150 watt, with a suitable 12″ reflector mounted on the top of the brooder supplies adequate warmth. A standard brass shell socket and heavy 2-wire, rubber covered wire are recommended. Hardware cloth under the reflector will serve as a suitable guard for the lamp.

In such a brooder, pigs may be confined for portions of the first day or two; allowed out every three hours to nurse. This is reported to be all the training required and thereafter the front plywood section may be removed. Operation cost of equipment shown is insignificant in proportion to saving effected by providing comfort for pigs during the first week or ten days of life.



FRAME ASSEMBLY



COMPLETED BROODER

Photo and drawing courtesy Oregon State College Agricultural Experiment Station, Corvallis

Anthrax In Livestock During 1949 And Incidence Of The Disease From 1945 To 1949

C. D. STEIN, V. M. D.*

FIVE years ago the author presented a report[1] reviewing the history of anthrax in livestock in the United States and giving data on its prevalence and distribution during the 30-year period from 1915 to 1944, inclusive. He pointed out that anthrax outbreaks were reported from widely separated regions as early as 1834 to 1889, that large areas of infection existed in seven states and smaller areas in at least seven additional states, and that during the 30-year period anthrax outbreaks were reported from at least 438 counties in 43 states. Since that time, two additional reports[2,3] have been presented on the incidence of anthrax in livestock from 1945 to 1948. The present report completes the five-year period from 1945 to 1949.

The data presented in this report, as in previous ones, are based principally on information received from Bureau inspectors in charge of field work in various states after consultation with the state livestock sanitary officials. Because of the difficulty in obtaining precise and complete information, as in all national surveys of this nature, the data presented cannot be considered 100% accurate. However, the facts and figures given represent a comprehensive picture of the national incidence of the disease in livestock for the period covered.

Table I shows the incidence of anthrax and loss of livestock (cattle, horses, sheep, and hogs, but mainly cattle) from the disease in each state reporting outbreaks during 1949. Tables II, III, and IV give comparable data for the five-year period from 1945 to 1949.

1949 Survey

The data compiled from the 1949 survey indicate that during the year 93 anthrax outbreaks in livestock were reported from 16 states involving 57 counties with a total loss of 773 head of livestock. It is evident from the tables that 1949 was not an anthrax year, as there were fewer outbreaks than in any of the years from 1945 through 1948. No major widespread outbreaks were reported during 1949. Most of the outbreaks were sporadic, occurred principally in cattle, and resulted in minor losses.

Of the 16 states reporting outbreaks, California, Louisiana, and Texas, in the order mentioned, reported the greatest number (56) and a loss of 694 head of livestock. These greatly exceeded the total number of outbreaks and losses of livestock in the other 13 states. (Table I.)

TABLE I. STATES REPORTING ANTHRAX OUTBREAKS* IN LIVESTOCK IN 1949 AND DATA ON INCIDENCE OF THE DISEASE.

State	Number Counties	Number Outbreaks	Livestock Loses
Alabama	1	1	1
Arkansas	1	1	1
California	11	25	315
Illinois	3	3	6
Indiana	1	1	7
Louisiana	17	18	298**
Minnesota	1	1	1
Mississippi	1	1	1
Missouri	1	2	6
Nebraska	5	7	12
New Jersey	3	3	14
New York	3	4	6
Pennsylvania	1	1	8
South Dakota	7	11	15**
Texas	10	13	81**
Wisconsin	1	1	1
Totals	57	93	773

*Cattle, horses, hogs, and sheep.
**Losses estimated.

As in previous years, some states reported a few cases in horses and swine, but California was the only state reporting outbreaks in sheep involving more than a few animals. In three outbreaks in this state involving 5,120 sheep, 222 head were lost.

Outbreaks in new areas which were confirmed by laboratory examination were reported from Fulton, Gallatin, and Whiteside Counties in Illinois, and from Henry County in Indiana. The outbreak in Indiana, which involved a herd of swine, was of considerable interest, since it was the first that has occurred in this state in more than 25 years. The history of the herd indicates that several hogs, after feeding on the carcass of a dead cow, developed symptoms suggestive of anthrax. *Bacillus*

*Pathological Division, Bureau of Animal Industry, Agricultural Research Administration, U.S. Department of Agriculture, Washington, D. C.

anthracis was recovered by Dr. L. P. Doyle of Purdue University from tissue specimens taken from one of the animals that died. The diagnosis was further confirmed by examination of the culture in the Bureau's laboratories in Washington, D. C. Although circumstantial evidence pointed to the carcass of the dead cow as the source of infection, this point was not definitely determined as no attempt was made to isolate anthrax from the carcass.

A positive case of bovine anthrax reported from Stanton County, Nebraska, in February 1949 was also of unusual interest, since the area was covered with an extremely heavy blanket of snow when the outbreak occurred. Although the origin of the infection was not determined, circumstances suggest that it may have been contaminated fodder.

An outbreak in unvaccinated cattle in Dane County, Wisconsin, in close proximity to an infected area is a good example of the recurrence of the disease in such an area and the apparent persistence of the infection in the soil. Two previous outbreaks in this area occurred in 1926 and 1941.

Records of the Federal Meat Inspection Division indicate that during the calendar year 1949, at establishments operating under Federal meat inspection, 24 hogs and two cattle were condemned for anthrax.

During the year, six cases of anthrax in man were reported to the Bureau. Two were from New Jersey and were of industrial origin, occurring in persons working with leather. The other four were from California. Two were of agricultural origin as they occurred in ranch hands during an outbreak of anthrax in sheep. The third case was in a hunter who developed anthrax from a scratch acquired while dressing a deer. However, the disease in the deer was not confirmed. The fourth case occurred in a woman who had suffered a flea bite while on

TABLE II. STATES REPORTING ANTHRAX OUTBREAKS* IN LIVESTOCK FROM 1945 TO 1949 INCLUSIVE, AND DATA ON INCIDENCE OF THE DISEASE.

	1945		1946		1947		1948		1949		Total for 5 Years	
State	Number Outbreaks	Livestock Losses	Number Outbreaks	Livestock Losses	Number Outbreaks	Livestock Losses	Number Outbreaks	Livestock Losses	Number Outbreaks	Livestock Losses	Number Outbreaks	Livestock Losses
Alabama	1	3	1	1	0	0	2	10	1	1	5	15
Arkansas	0	0	0	0	20	60	0	0	1	1	21	61
California	47	170	38	239	31	259	28	149	25	315	169	1132
Colorado	1	8	2	45	0	0	0	0	0	0	3	53
Indiana	0	0	0	0	0	0	0	0	1	7	1	7
Illinois	0	0	2	15	1	1	1	1	3	6	7	23
Iowa	0	0	1	1	0	0	0	0	0	0	1	1
Kansas	1	5	0	0	0	0	0	0	0	0	1	5
Kentucky	0	0	0	0	4	35	0	0	0	0	4	35
Louisiana	0	0	1**	3000	0	0	1**	1200	18	298***	20	4498
Maryland	0	0	1	1	0	0	0	0	0	0	1	1
Massachusetts	0	0	0	0	1	7	0	0	0	0	1	7
Minnesota	10	13	0	0	1	3	3	13	1	1	15	30
Mississippi	7	35	9	66	4	52	30	118***	1	1	51	272
Missouri	3	30	48	239	24	113	9	15***	2	6	86	403
Nebraska	3	34	3	15	4	15	11	17	7	12	28	93
Nevada	1	6	2	12	2	26	4	19	0	0	9	63
New Jersey	0	0	0	0	0	0	1	1	3	14	4	15
New Mexico	1	14	1	21	0	0	0	0	0	0	2	35
New York	1	1	3	3	4	4	5	8	4	6	17	22
North Carolina	0	0	1	1	0	0	0	0	0	0	1	1
North Dakota	2	28	0	0	0	0	0	0	0	0	2	28
Oklahoma	0	0	0	0	1	28	0	0	0	0	1	28
Oregon	0	0	0	0	1	6	0	0	0	0	1	6
Pennsylvania	0	0	1	2	1	3***	0	0	1	8**	3	13
South Dakota	12	32	29	80	8	30	11	30***	11	15***	71	187
Texas	7	204	19	277	14	233	13	44	13	81***	66	839
Utah	0	0	1	1	0	0	0	0	0	0	1	1
Virginia	0	0	0	0	1	3	0	0	0	0	1	3
Washington	0	0	0	0	1	1	0	0	0	0	1	1
Wisconsin	0	0	0	0	1	1	0	0	1	1	2	2
Wyoming	0	0	0	0	0	0	1	29	0	0	1	29
Totals	97	583	163	4019	124	880	120	1654	93	773	597	7909

*Cattle, horses, sheep, and hogs. **Major outbreaks involving numerous premises. ***Losses estimated.

a visit to Oregon. On her return to California, an anthrax lesion developed at the site of the bite. In this connection, during the past several years at least three additional cases of anthrax in man following insect bites have been reported to the Bureau from widely separated areas, namely, Maine, South Dakota, and Texas. Heeren[4] has also pointed out that several such cases have been reported in Louisiana.

Records of the U. S. Public Health Service[5] from January 1 to September 30, 1949, covering reports on notifiable diseases for the three quarters of the year, list 48 cases of anthrax in man, 40 of them being from the New England States, New York, New Jersey, and Pennsylvania, an area where cases of industrial origin usually predominate.

Anthrax Outbreaks from 1945 to 1949

Table II indicates that during this five-year period, 1945 to 1949, one or more outbreaks were reported from each of 32 states. During this period there were 597 outbreaks and a total loss of 7,909 head of livestock. With the exception of Missouri, outbreaks were most numerous and livestock losses were heaviest in the old anthrax areas of California, Louisiana, Mississippi, Nebraska, South Dakota, and Texas. (Table IV.)

Although most of the outbreaks were sporadic and resulted in minor losses, one or more sharp outbreaks involving considerable losses occurred in Arkansas, California, Colorado, Kentucky, Missouri, Nevada, Oklahoma, Texas, and Wyoming. Louisiana was the only state that reported widespread severe outbreaks. Epizootics of this nature occurred there in 1946 and 1948 with heavy losses of livestock.

TABLE III. SUMMARIZED DATA ON INCIDENCE OF ANTHRAX IN LIVESTOCK FROM 1945 TO 1949 INCLUSIVE.

Year	Number States Reporting	Number Counties Involved	Number Outbreaks	Livestock Losses*
1945	14	52	97	583
1946	18	82	163	4,019**
1947	19	65	124	880
1948	14	63	120	1,654**
1949	16	57	93	773

*In some states losses were estimated.
**Heavy losses were reported during severe epizootics of the disease in Louisiana.

Missouri reported a few outbreaks previous to 1945, showing a marked increase in the prevalence of the disease by reporting 86 outbreaks and livestock losses of 403 head during this five-year period.

Nebraska and South Dakota, where numerous outbreaks and heavy losses of livestock formerly occurred, showed a marked decrease in the prevalence of the disease. From 1940 to 1944, inclusive, South Dakota reported 416 outbreaks and Nebraska 77, whereas during the last five-year period, South Dakota reported only 71 outbreaks and Nebraska 28. Annual preseasonal prophylactic vaccination of cattle on a wide scale and strict sanitary police measures are no doubt the principal factors responsible for the marked decline.

TABLE IV. STATES REPORTING MOST ANTHRAX OUTBREAKS FROM 1945 TO 1949 INCLUSIVE.

State	Number Outbreaks	Livestock Losses*
Arkansas	21	61
California	169	1132
Louisiana	20**	4498
Mississippi	51	272
Missouri	86	403
Nebraska	28	93
South Dakota	71	187
Texas	66	839

*In some states losses were estimated.
**Major widespread epizootics in 1946 and 1948.

During this period, outbreaks in new areas were reported from 49 counties in 14 states as follows: from one county each in Colorado, Indiana, Kansas, North Dakota, Oklahoma, Pennsylvania, and Wyoming; two counties each in Arkansas and Kentucky; four counties each in Missouri and Mississippi; five counties in Illinois; ten counties in Louisiana; and 15 counties in Texas. The source of infection in most of these counties was not determined, but in some instances contaminated food was suspected. A number of reports have appeared in the literature incriminating contaminated bone meal, blood meal, oil meal, and fodder as the source of infection in new areas.

To prevent the introduction and spread of anthrax by contaminated bone meal, North Carolina in 1942 adopted a regulation requiring that all ground or crushed bonemeal or animal feeds containing bonemeal intended for feeding purposes be heated sufficiently to destroy all anthrax spores. Since this regulation was adopted, few anthrax outbreaks have occurred.

In this connection, Leonpacher[6], who has had considerable experience in the control of anthrax in Louisiana, recently expressed the opinion that one of the primary factors in the spreading of anthrax into new areas in the United States is the use of stock feed mixtures containing rice products, such as brewer's rice, rice polish, or rice bran from plants grown in anthrax infected areas in the Delta region of Arkansas, Louisiana, and Texas.

From 1945 to 1949, the following 16 states reported no anthrax outbreaks: Arizona, Connecticut, Delaware, Florida, Georgia, Idaho, Maine, Michigan, Montana, New Hampshire, Ohio, Rhode Island, South Carolina, Tennessee, Vermont, and West Virginia.

During this period, 20 cases of agricultural anthrax in man acquired by direct contact with the carcasses of animals dead of the disease were reported to the Bureau. Fifteen of these cases occurred in agricultural workers and five in veterinarians. It is highly probable that additional cases of agricultural anthrax in man occurred but were not reported to the Bureau.

Records of the U. S. Public Health Service[6,7] from January 1, 1945, to September 30, 1949, list 252 cases in man, most of which were of industrial origin as they occurred principally in persons employed in the processing of wool, leather, and hair in plants in New England, New York, New Jersey, and Pennsylvania.

Records of the Federal Meat Inspection Division indicate that from July 1945 to December 1949, at establishments operating under Federal meat inspection 122 hogs and 38 cattle were condemned for anthrax (including spore vaccine lesions).

Summary and Conclusions

Results of a nation-wide survey to determine the incidence of anthrax in livestock in 1949 indicate that 93 anthrax outbreaks in livestock were reported from 16 states involving 57 counties with a total loss of 773 animals. No major outbreaks were reported. Most of the outbreaks were sporadic, occurred principally in cattle, and resulted in minor losses. Of the 93 outbreaks reported, 56 occurred in three states, California, Louisiana, and Texas, with a total loss of 694 head of livestock. Outbreaks in new areas in 1949 were reported from three counties in Illinois and one county in Indiana.

During the five-year period 1945 to 1949, there were 597 outbreaks and losses of 7,909 head of livestock in 32 states. With the exception of Missouri which showed a marked increase in the incidence of the disease, outbreaks were most numerous in the old anthrax areas of California, Louisiana, Mississippi, Nebraska, South Dakota, and Texas. Two widespread virulent outbreaks occurred in Louisiana, and sharp outbreaks in at least nine other states. Outbreaks in new areas were reported from 49 counties in 14 states.

At establishments operating under Federal meat inspection, 122 hogs and 38 cattle were condemned for anthrax from July 1945 to December 1949, inclusive.

During the five-year period, 20 cases of anthrax in man, 15 in agricultural workers and five in veterinarians, were reported in connection with outbreaks in animals.

In view of these findings, it is evident that anthrax of livestock and man is still of considerable importance from an economic as well as a public health standpoint. In areas where the infection is known to exist, every effort should be made to prevent its occurrence and check its spread by the recognized methods of control, such as annual preseasonal vaccination and strict sanitary police measures.

REFERENCES

1. Stein, C. D., The History and Distribution of Anthrax in Livestock in the United States. *Vet. Med.*, 40:340 (Oct.), 1945.
2. Stein, C. D., Incidence of Anthrax in Livestock During 1945, 1946, and 1947, with Special Reference to Control Measures in the Various States. *Vet. Med.*, 43:463 (Nov.), 1948.
3. Stein, C. D., Anthrax in Livestock During 1948. *Vet. Med.*, 44:246 (June), 1949.
4. Heeren, Ralph H., Anthrax in Louisiana. *New Orleans Med. and Surg. Jour.*, 99:545 (May), 1947.
5. *U. S. Public Health Reports*, 64:20 (July 22), 1949; 64:41 (Oct. 14), 1949; and 64:50 (Dec. 16), 1949.
6. Leonpacher, Louis, The Control of Anthrax. *N. Am. Vet.*, 29:419 (July), 1948.
7. *U. S. Public Health Reports*, 61:12 (Mar. 22), 1946; 62:11 (Mar. 14), 1947; 63:12 (Mar. 19), 1948; 63:29 (July 16), 1948; 63:44 (Oct. 29), 1948; 64:7 (Feb. 18), 1949; 64:20 (May 20), 1949.

▼ ▼ ▼

Meeting of the Foot-and-Mouth Disease Advisory Committee

The Industry Advisory Committee on Foot-and-Mouth Disease met in Albuquerque, N. Mex., on February 19 with officials of the Commission and the Bureau of Animal Industry. General Johnson described recent progress in the work in Mexico and Doctor Simms and members of his staff discussed other phases of the battle to keep foot-and-mouth disease out of the United States and the plans for additional research. The fact that the advance of foot-and-mouth disease in Mexico has been controlled and that fewer outbreaks have occurred during the three years of cooperative effort bids fair to remove the foreboding shadow of invasion across the international boundary. The success so far attained in Mexico, which gives promise of a happy conclusion, is a credit to those who have participated in this gigantic task.

EDITORIAL COMMENTS

Diagnosis of Pregnancy in Cattle

Early pregnancy diagnosis is valuable in the selection of non-breeders, either because of physiological maladjustment or genital infections. In addition, the early recognition of sterility or relative infertility in the sire is possible.

Recent letters from correspondents on the subject have been reproduced in *The Veterinary Record*; that of Mr. D. N. Spriggs appearing in the issue for March 11, 1950, emphatically states that there is overwhelming evidence of pregnancy at six weeks after breeding, apart from a well-developed corpus luteum.

Without reliance on ovarian changes, diagnosis of pregnancy is made on the palpation of a blastula (blastocyst) in the uterine cornua. The method employed requires that the entire free portions of the cornua be brought within the hand's grasp. Starting at the posterior attached end and with forefinger and thumb gently grasping the left horn, the hand is passed anteriorly, following the curvature of the horn until the size of the latter narrows appreciably, indicating the approaching junction with the fallopian tube. The process is then repeated on the right side. In the pregnant cow, usually about three inches anterior to the intercornual ligament, a soft, spherical, bladder-like object will slip posteriorly through the thumb and finger. This is the mammalian blastula or germinal vesicle. At the 30-day stage in the heifer, it usually can be felt as being the size of a small marble; at six weeks, the size of a golf ball. After this stage, an ovoid shape is gradually assumed as fetal fluid extends along the horn. It is at this stage that the palpation of the fetal membranes become an invaluable diagnostic aid. These are not pinched, but the whole picked up and held gently, then gradually released through the thumb and finger. The escape of the fetal membranes is abrupt and is followed by escape of the uterine wall giving the operator a characteristic sensation. Growth of the fetal membranes after six weeks' pregnancy is rapid and by the eighth or ninth week can be palpated throughout the length of the pregnant horn. After this period, the use of the aid is impractical. The size and fluctuating distention of the pregnant horn in comparison with the opposite one is sufficient to establish diagnosis. At three months it is usually possible to detect cotyledons by palpation.

Using these methods, with the author's extensive experience, claim is made that diagnosis is 99% accurate at five weeks' pregnancy in heifers and six weeks in cows. In the majority of cases, one should be able to give a definite decision in 30 days.

▼ ▼ ▼

Lactic Acid Dairy Products

Veterinarians using penicillin for udder infusion in the treatment of bovine mastitis in dairy cows regularly leave instructions with owners to keep milk from treated cows out of the supply going to dairy plants, for obvious reasons. When such instructions are not followed, or when penicillin is used promiscuously by owners in suspected mastitis-infected quarters, secreting milk little changed in physical properties, adding such milk to the total delivered to the cheese or butter plant, constitutes a hazard to dairy plant cultures.

Confirming conclusions derived from research, workers at the Florida Agricultural Experiment Station have demonstrated the fact that a very low concentration of penicillin in milk inhibits lactic acid producing microorganisms and interferes in the production of lactic acid dairy products. It has been estimated that milk from one cow (four treated quarters) makes unsuitable for cheese production, milk from 80 untreated animals, if mixed.

▼ ▼ ▼

"There is no place for dogma in science. The scientist is free to ask any question, to doubt any assertion, to seek for any evidence, to correct any error. Where science has been used in the past to erect a new dogmatism, that dogmatism has found itself incompatible with the progress of science; and in the end, the dogma has yielded, or science and freedom have perished together."—J. Robert Oppenheimer, *S.N.L.*

▼ ▼ ▼

Of a group of 155 dogs in the Montreal, Canada, area examined for intestinal parasites, Chaquette and Gelinas (*Canad. Jour. Comp. Med. & Vet. Sci.*, 14:33 [Feb.], 1950.) found protozoan infections in 71.6% and nematode infections in 81.15%.

▼ ▼ ▼

Ethics is performance in a fashion which is rewarded by personal satisfaction.

Progress of Foot-and-Mouth Disease Campaign in Mexico

The Joint Mexican-United States Commission for the Eradication of Foot-and-Mouth Disease passed another milestone when the second round of vaccinations of susceptible animals within the quarantine zone was completed early in February. The Commission expects to finish third vaccinations by May 1, at which time the fourth round will be about 75% complete.

Few realized the fantastic proportions of the foot-and-mouth disease vaccination program when substituted in Mexico for the system of eradication by slaughter. Results of the tremendous task may be visualized by statistical information furnished by the BAI in report of progress in the Mexican campaign under date of March 20, 1950. Year's end reports through 1949 show a cumulative total of 40,093,065 vaccinations. During January and February 1950, another 7,985,760 animals were vaccinated, making a total of over 48,000,000 vaccinations since mass vaccinations were begun.

Vaccine production is being maintained at satisfactory levels to carry out the requirements of the program. At the end of the year, the Commission had manufactured 42,324,000 doses of vaccine since production facilities were provided in Mexico in May 1948. During January and February 1950, records show an additional 7,200,000 doses for a total of over 49,000,000.

Slaughter operations give an accurate indication of the existence of foot-and-mouth disease in the country since every pocket of active infection, recognized by constant and repeated inspections, is wiped out by accepted eradication methods. The total slaughter for 1949 was 8,009 actively infected and exposed animals. Of this number, 7,329 were slaughtered during the first six months of the year. During January 1950, only 15 condemned animals were slaughtered. None were slaughtered in February.

Efficiency of quarantine and disinfection measures is pointed out by the fact that during the past year no reinfection of animals occurred on previously contaminated premises after disinfection and testing by Commission brigades. Outbreaks of active infection were prevented from spreading and completely eradicated.

Type "O" Virus Declared Eradicated

The outbreak of foot-and-mouth disease caused by type "O" virus reported in Chicoloapan, State of Mexico, last October, was declared officially eradicated when the special quarantine was lifted on February 14.

The type "O" infection occurred on one ranch about 15 miles from Mexico City, and involved 269 animals. These animals were slaughtered October 24, 1949. The premises were cleaned, completely disinfected twice, and held under strict quarantine. Thirty days later susceptible test animals were introduced and kept on the grounds for about 90 days. During this time, animals in surrounding areas were inspected regularly. When none of the test animals became infected and no evidence of the disease was found in surrounding areas, the quarantine was lifted.

There are three known types of foot-and-mouth disease virus. Types "A" and "O" are most frequently present in European outbreaks of the disease. Type "C" occurs frequently in Mediterranean areas, and all three types are present in South America. With the exception of the one case cited above, all infection in Mexico since the current outbreak was discovered in 1946 has been from type "A" virus. Immunity built up against one type is not effective against exposure to another. Every possible effort was made to trace the origin of the type "O" virus in Chicoloapan, but the Commission was unable to discover the means of its introduction.

Other Evidence of Active Infection

An infection of type "A" virus was reported in the State of Jalisco, December 21. Evidence indicated that the infection was several weeks' old in some animals at the time it was first reported. A total of 73 animals involved in the outbreak were slaughtered, some of which were strays.

Where the first vaccination had been completed, nine outbreaks were found affecting a total of 1,963 head. In zones where the second vaccination had been completed only two outbreaks, affecting 115 head of cattle, are recorded. Three outbreaks involving only a few animals have occurred where the third dose of vaccine was given. No outbreaks have been reported in areas where animals have received the fourth vaccination.

These circumstances illustrate the necessity for constant and repeated inspections of all susceptible animals as well as immediate investigation of suspicious herds.

No outbreaks have been identified in any area since December.

Preparations Under Way for Final Phase of Program

The Joint Commission is preparing to carry out plans announced earlier to terminate mass vaccination as soon as it may be done with practical safety. The Commission expects to be approaching this point about May 1 when the third vaccination will be virtually complete and the fourth vaccination will have covered most of those areas in which the disease has been most concentrated in the past. However, the Commission will continue at least some vaccinations for several months.

In line with these plans, vaccine production in Mexico will be halted as soon as there is enough vaccine available to complete the planned schedule, in addition to a stockpile of about 7,500,000 doses for use in emergencies.

Now, more than ever, the special emphasis of the eradication program is being placed upon inspection. Inspection brigades are being increased and inspectors are redoubling their efforts. The utmost importance is placed upon vigilance in spotting any indication of active infection plus quick action in stamping it out through the accepted methods of quarantine, slaughter, disinfection and testing.

The final phase of the program, which comprises the work of exploration for the existence of the virus and the continuous inspection of animals in the infected zone hopefully will conclude the Commission's work.

Cannot Predict Border Opening

In response to many inquiries about opening the border to importation of cattle from Mexico in the near future, the Department calls attention to the provisions of the Tariff Act of 1930 which specifically prohibit the importation into the United States of any cattle, sheep, other domestic ruminants or swine and of fresh, chilled, or frozen beef, veal, mutton, lamb, or pork from any country where foot-and-mouth disease exists.

The Mexico-United States border cannot be reopened until a determination has been made by the Department that the virus causing the disease no longer exists in any part of Mexico. When the immunity built up by the mass vaccinations has had time to wear off, it may be expected that sporadic outbreaks will occur. Therefore, consideration cannot be given to the opening of the border until a sufficiently long period has elapsed after the last known outbreak has been stamped out and thorough inspections have been made to determine that the disease no longer actually exists. Accordingly, the time when the border may be opened is so exceedingly indefinite that no forecast can reasonably be made. It can be said only that such action does not appear at all possible in the near future.

Experiments with Vaccine Continue

Recent tests have indicated that it might be possible to advance the expiration date for use of vaccine to from 12 to 15 months after production. Heretofore, vaccine was not considered practicable for use unless it could be injected within seven to nine months after manufacture, because its potency had not been proved beyond that point. These tests are being continued in an effort to determine the length of time vaccine can be held in storage before it is used.

Also being continued are the intensive studies of technic for propagating the virus of foot-and-mouth disease upon an artificial medium in the laboratory. Basically the procedure being investigated follows that developed originally in the Netherlands. Minced epithelium from the tongues of recently slaughtered normal cattle is placed in a synthetic nutrient fluid. The virus is added and allowed to incubate and multiply.

The goal of this work is to develop procedures for the preparation of vaccine from such artificially propagated virus. This would materially simplify vaccine production and make it less expensive.

Canned Mexican Beef

Since the beginning of the program in August 1947 approximately 218,000,000 pounds of canned beef products have been purchased in Northern Mexico. At the present time there are no purchase contracts in effect. Approximately 150,000,000 pounds have been sold. The major portion of these purchases have gone to Bizone, Germany, United Kingdom, International Refugee Organization, Italy, Austria, Trieste and other Western European countries. Stocks now on hand total approximately 68,000,000 pounds.

▼ ▼ ▼

Erratum

The publishers of Meat and Meat Foods: Processing and Preservation from Meat Plant to Consumer, were erroneously given in the review which appeared in VETERINARY MEDICINE, March 1950, page 137. This book, by Dr. Loyd B. Jensen, was published by The Ronald Press Company, 15 East 26th St., New York 10, N. Y.

Baranti's Veterinary Hospital

Veterinary hospitals constructed since the close of World War II reflect the modern trend in design for combining beauty of line for exteriors and utility in arrangement for efficient operation. An excellent example is shown in the series of reproductions of photographs of Baranti's Veterinary Hospital, located at 2835 South Willamette, Eugene, Ore.

Dr. A. C. Baranti, TEX '43, owner and director, has incorporated necessary elements for a veterinary hospital to make serviceable utilization of space within a pleasing exterior.

Construction details include exterior walls of pumice blocks with horizontal striking of the joints to give a wood side appearance. Interior surfaces of the walls are plastered. Radiant heating is installed throughout the building. Other features include a built-in incinerator operated by propane gas for use in disposal of accumulated wastes or for use as a crematory, a maternity ward, *x*-ray room, two sets of runways (located on opposite sides of the building), a generous sized attendant's apartment, and ample storage space. Skylights of special design provide adequate light and ventilation to rooms having no exterior walls. Built-in cages, lined with tile board for easy cleaning, are provided for 75 small animals. Well equipped laboratory, examination room, surgery, and *x*-ray room make it possible for Doctor Baranti to render a complete professional service to pet owners in his location.

Fig. 1. Combination of neat, clean-cut lines with overhanging roof reflect modern design of the hospital exterior.

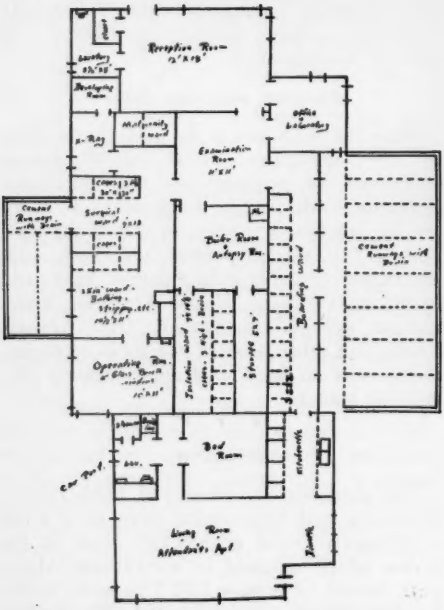


Fig. 2. Sketch of floor plan illustrates the arrangement of the elements included in the hospital.

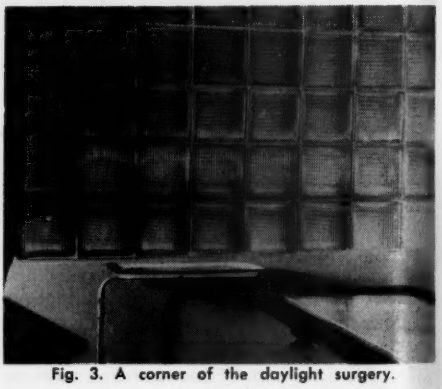


Fig. 3. A corner of the daylight surgery.

Make-Believe Veterinarians

Make-believe veterinarians include the druggist and his clerk, who prescribe and sell medical agents for livestock diseases, the nostrum peddler who "graduated" from the short course, the "mail order veterinarian", the well meaning neighbor, and other unqualified persons whose advice is free, without foundation on fact and, thus, valueless.

Sardonical comments under this heading appear in The Vitamineral News, First Quarter, 1950, as a rewrite of an editorial of a similar nature published by this interesting house organ of the Vitamineral Products Company of Peoria, Ill., almost 30 years ago.

The danger existent in unqualified prescriptions for the use of potent drugs to control animal plagues and parasitism is an increasing menace to profitable production as livestock disease problems become more complex. From the point of view of profit to livestock growers and food conservation, veterinary practitioners are best qualified as consultants in improved animal husbandry practices, including feeding, as they influence disease control and prevention measures.

▼ ▼ ▼

In general, the use of anesthesia in the treatment of wild animals in captivity helps to dispel the arguments of those of the public who do not believe in zoological collections in any form.—J. A. Campbell, Toronto, Ont.

American Animal Hospital Association to Convene at Denver, Colorado

Dr. J. Stuart Crawford, practitioner at New Hyde Park, N. Y., will preside at the annual meeting to be held at the Shirley-Savoy Hotel at Denver, April 24-27, 1950.

▼ ▼ ▼

Curare as Support of Narcosis and Therapy

Complete relaxation of muscles can be induced with the help of small doses of curare or of one of its active ingredients. This is valuable in experiments with repositions, in epilepsy, tetanus, trismus, spasmotic paralysis, poliomyelitis, etc. During surgery, reflexes are reduced to a minimum.

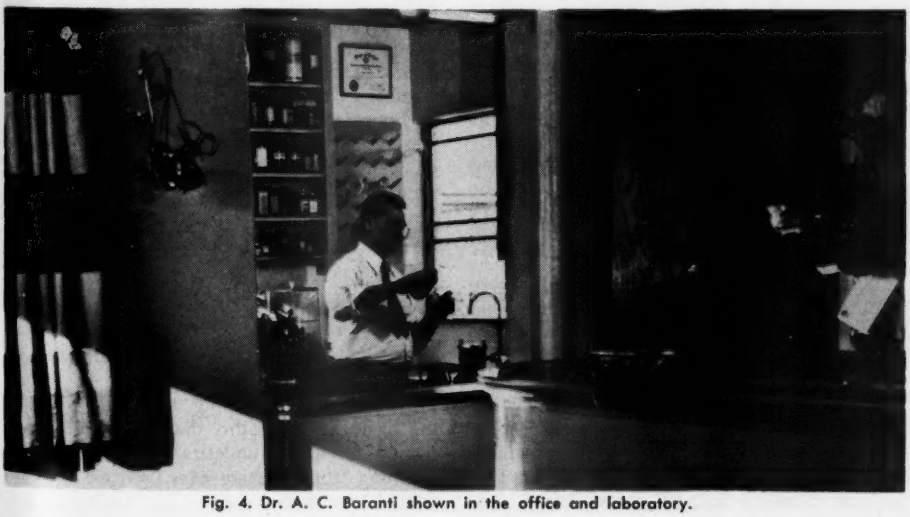


Fig. 4. Dr. A. C. Baranti shown in the office and laboratory.

POULTRY PRACTICE PROBLEMS

W. R. HINSHAW, D.V.M., Ph.D.
Frederick, Maryland

Newcastle disease virus lived on the skin of an artificially infected eviscerated carcass for 96 days when stored at 34 F. and in bone marrow for 134 days. When an infected carcass was stored without removing the feathers, the virus lived on the skin for 160 days and in the bone marrow for 196 days. When infected carcasses were stored at —4 F. the virus was still alive after 300 days. This information is available as a result of a report by Asplin (*Vet. Rec.*, 61: 159, 1949). He also found that the virus became inactive on egg shells after 44 hours, and on filter paper in 12 hours if these objects were stored at 37 C. Other interesting observations made by Doctor Asplin are: A pig inoculated with Newcastle virus excreted the virus for 48 hours; and rats fed the virus excreted it for 24 hours. These last observations especially have significance and may explain how some outbreaks have resulted from contacts with such animals.

▼ ▼ ▼

A subscriber to VETERINARY MEDICINE recently requested information on books and bulletins available on poultry diseases. Perhaps other readers would like similar information. Two recently revised books that can be recommended are the following:

1. Diseases of Poultry—Edited by Dr. H. E. Biester and L. H. Schwarte, published by Iowa State College Press, Ames, Iowa.

2. Diseases and Parasites of Poultry, by Drs. E. H. Barger and L. E. Card, published by Lea and Febiger, Philadelphia.

These books may be obtained also through the book department of this journal.

3. The U. S. Department of Agriculture has recently revised Farmers' Bulletin no. 1652 on Diseases of Poultry. It can be secured by writing to the Office of Information, U. S. Department of Agriculture, Washington, D. C. Almost every agricultural college and experiment station also publishes at least one bulletin on poultry diseases. These can be secured by writing to the publications offices of the agricultural college in your state.

A new bulletin, recently announced by the Pennsylvania Agricultural Experiment Station, State College, Pennsylvania, is, Sulfonamides for Cecal Coccidiosis in chickens, by Drs. Stephen Gordeuk and W. T. S. Thorp. The authors record the results of their experiments with several of the sulfonamides and give recommended strength of dosage for treating this disease. Stress was given to the fact that prevention was found better than any cure.

If an extensive review of investigations on coccidiosis is desired, a recent publication by the New York Academy of Sciences is recommended. It consists of a compilation of the reports of 42 specialists who presented papers at a symposium on this subject, sponsored by the Academy about a year ago. It is edited by Dr. Sterling Brackett and published as a separate report from volume 52 (pp. 429-624) of The Annals of the New York Academy of Sciences, New York City. It can be purchased for $3.00.

▼ ▼ ▼

The survival time of tapeworm larvae following the treatment of intermediate hosts with DDT has been studied by Todd and his associates at the University of Kentucky (*Poul. Sci.*, 28:626, 1949; and 29:156, 1950). They found that the cysticercoids of the tapeworm *Railletina cesticillus* inside an intermediate host, a flour beetle, were capable of infecting chickens after seven hours of continuous exposure of the beetles to a DDT sprayed surface. The numbers of tapeworms recovered from chickens fed the treated beetles were less, however, than from the controls fed untreated beetles. In a second experiment, beetles were exposed to DDT for various times up to 48 hours. There was marked variation in the number of tapeworms recorded but even after 48 hours' exposure of the intermediate host, at least one tapeworm was recovered from the chicken that ate it. The data did indicate a rapid mortality of the cysticercoids after 24 hours' exposure of the beetles to a sprayed surface of DDT.

▼ ▼ ▼

A new method of freezing eggs in the shell is described by Kaloyereas (*Science*, 109:171, [Feb. 18], 1949). This process consists first of slight dehydration, followed by freezing under vacuum. Freezing is accomplished without cracking the shell. According to the investigator, the method described by him minimizes undesirable changes usually resulting from freezing eggs, and the eggs are suitable for home use.

VETERINARY PARASITOLOGY

A. O. FOSTER, B.A., M.A., Sc.D.
Beltsville, Maryland

Northern Cattle Grub on the International Border

A state-wide survey by entomologists of the University of California[2] revealed that the northern cattle grub, *Hypoderma bovis*, as well as the common species, *H. lineatum*, is generally distributed throughout the state and occurs in native stock as far south as the international border. The former was first found in California in 1947 and, in the present survey, *H. bovis* was found in 39 of 44 counties. Of great practical concern is the fact that three treatments at 30-day intervals, as presently recommended in the state, will not provide adequate control because the emergence of grubs from the backs of cattle extends over a period of six months, possibly even longer.

▼ ▼ ▼

Resistance to Antiparasitic Chemicals

As every veterinarian knows, the occasional failures of drugs to achieve the expected and desired results in specific instances may result from innumerable causes, probably referable, in large measure, to carelessness or ignorance. Moreover, drug failures not thus explainable are unlikely to be encountered with any alarming frequency because of the nature of specific medication. There may have been inadequate recognition, however, of the fact that pathogenic organisms, pests, and parasites often become tolerant of drugs or chemicals to which they had formerly been highly susceptible. This appears to occur most commonly under circumstances of continued chemical attack on more or less confined unit-concentrations of organisms, such as the blood-inhabiting parasites in an individual animal, or the concentration of fever ticks in an area where a sub-eradicative dipping practice has been almost universally employed. Another good example is the number of internal parasites in a comparatively closed sheep flock, although fortunately no substantiated instance of specific drug resistance appears to have been encountered along this particular line.

During the past two years, the importance of the phenomenon under discussion has been emphasized by the increasing concern over the widespread resistance of flies and other pests to the chlorinated insecticides, notably DDT. Isolated instances of naturally occurring resistance to DDT have been reported from Sweden, Italy, the United States, Denmark, and probably elsewhere. The alarming extent of almost complete resistance, induced by widespread application of the insecticide, has been emphasized repeatedly in recent literature. Moreover, in spite of the fact that resistance to chemicals is basically specific in nature, there is ample evidence that flies, for example, which become resistant to DDT also become capable of developing resistance more rapidly to related insecticides.

No discussion can be given herein of this involved, important, and interesting subject, but one should bear in mind that the development of drug resistance has been recognized since the beginnings of the science of chemotherapy a half-century ago, and that it is the rule, rather than the exception, for such resistance to eventuate whenever organisms are exposed to repeated chemical attack. A few general accounts of drug resistance, such as those cited below[6,7], make interesting and profitable reading.

The occurrence of drug resistance, however widely recognized, has not been well explained. Undoubtedly, it is largely a phenomenon of genetics, having a "genetico-physiological" basis, and a natural and inevitable evolutionary consequence of drug use. Finally, the chemical selection of genetic or mutant types that are capable of surviving under continued exposure to a chemical has led, in a few well studied instances, to the production of strains that are quite dependent for their existence on the continued presence of the chemical. Such selection must not be regarded as a full explanation, however, for the reason that certain other mechanisms, including adaptive enzyme metabolism, have been shown to play an important role in many instances.

---

2. Furman, D. P., Douglas, J. R., and McKay, K. G., Cattle Grub Distribution in California. *Jour. Econ. Ent.*, 42(5):842-843, 1949.

[6]Findlay, G. M., Recent Advances in Chemotherapy, ed. 2, Philadelphia, P. Blakiston's Son & Co., Inc., 1939, pp. 187-200.

[7]Work, Thomas S. and Work, Elizabeth, The Basis of Chemotherapy, New York, Interscience Publishers, Inc., 1948, pp. 244-303.

ABSTRACTS OF LITERATURE

Desoxycorticosteron, a Hormone for the Treatment of Acetonemia in Cattle

Although the etiology of acetonemia in cows is not completely understood, many treatments have been proposed and have proved useful. One of the best ones, according to experiments performed at the veterinary clinic of the University of Gent (Belgium)[18] is the injection of the suprarenal gland hormone desoxycorticosteron. Two doses of 25 mg. each are given daily for four days. Four pounds of sugar administered in the form of concentrated solutions via the stomach tube, supplement the proposed hormone therapy. For cows that are constipated, sodium sulfate or epsom salts should be added. Of 49 patients treated, recoveries were obtained in approximately 80% within four or five days. A rapid increase in milk yield after treatment was a surprising observation of the author. It was noted, however, that too early, heavy feeding induced relapses. Most resistant cases were those in which acetonemia was complicated by diarrhea.

These experiments do not prove that acetonemia is caused by hypofunction of the suprarenal glands, but only that desoxycorticosteron is helpful in restoring disturbed metabolism. This hormone may possibly act in part by converting vitamin B_1 into its pyrophosphate, in which form it seems to be better utilized by the system.—G.L.

▼ ▼ ▼

Sudden Death Following Narcosis with Chloral Hydrate

Chloral hydrate is perhaps one of the most practical somniferous agents for horses[19]. If administered intravenously in 10% solution at the rate of 0.06 to 0.08 gm. per kg. body weight, it is considered safe. However, occasionally horses die suddenly under chloral hydrate hypnosis. Investigations have proved that these accidents are caused by a reflex stimulation of the vagus nerve in patients whose hearts have been weakened by chloral hydrate. (This drug is more dangerous for dogs than for horses, because of the naturally high vagus tone of the former.) Epinephrine and its derivatives should not be used in connection with chloral hydrate because of the action of these stimulants on the vagus nerve. However, if they must be used as emergency agents, it is advisable to give atropine simultaneously to counteract the vagal action.—G. L.

▼ ▼ ▼

Antibodies After Rabies Vaccination

Antibody response to rabies vaccination in the serum has been reported as neutralizing antibodies and complement-fixing antibodies. Meager evidence suggests that these are not identical. In support is the finding of Habel that monkeys developing rabies showed no complement-fixing antibodies although virus-neutralizing antibodies were present in the serum.

Results of experiments reported[17] with serum specimens from persons who had received antirabies treatment indicate that the virus-neutralizing antibodies are quite distinct from the complement-fixing antibodies in comparative titration endpoints and time interval of maintenance.

Prevaccination blood samples were taken from 69 individuals who received the Semple-type, phenol-killed rabies vaccine (14 injections) and from 18 who received only seven injections, and at frequent intervals following the antirabies vaccination. Both virus-neutralizing and complement-fixing antibodies were induced in both groups of patients, but in all instances the neutralizing index reached higher levels and persisted longer than did the complement-fixation titer. The highest antibody levels were attained in those patients who received the greater number of vaccine injections.

Of the group of persons whose serum was studied, four had had previous antirabies treatment as much as two years prior to this study. In all of these, neutralizing indices were demonstrated prior to vaccination and all showed a marked antibody rise or booster effect on revaccination.

---

[18]Vandeplassche, M., Desoxycorticosteron in the Treatment of Acetonemia of Cattle. *Vlaams Diergeneeskundig Tijdschrift*, 18:197, 1949.

[19]Volker, R., and Krause, D., Sudden Death During Chloral Hydrate Narcosis. *Deut. Tierärztl. Wochenschr.*, 57:25, 1950.

[17]LaBell, Irving, De Boer, Carl J., Hazz, Edna K., and Cox, Herald R., Complement-Fixing and Neutralizing Antibody Studies on Humans Vaccinated Against Rabies. *Proc. Soc. Exp. Bio. & Med.*, 73:225 (Feb.), 1950.

BOOK REVIEWS

Books reviewed in this department and any other books, if available, may be obtained by remitting the published price to the Book Department, Veterinary Medicine, Suite 803 Livestock Exchange Building, Kansas City 15, Missouri.

FEDERAL FOOD, DRUG, AND COSMETIC ACT 1938-1949, by *Vincent A. Kleinfeld* and *Charles Wesley Dunn.* 895 pages. Commerce Clearing House Inc., Chicago 1, Ill., publishers, 1950.—Price $17.50.

While the book was planned by both experts, its contents were prepared by Mr. Kleinfeld alone, the man in charge of litigation under the Federal Food, Drug and Cosmetic Act in the U. S. Department of Justice. Even though this book is primarily of interest to people concerned with the manufacture and distribution of foods (and feeds), drugs, and cosmetics, as well as to lawyers and food and drug administration (FDA) inspectors, it should also prove of value to veterinarians and physicians who do private formula business. It is an authoritative reference book which contains all important court decisions (560 pages), FDA trade correspondence (195 pages), statements of FDA policy (8 pages), table of references (62 pages) and finally reprints of the F.D.&C. Postponement, Butter, Wrapped Meats, and Skim Milk acts. Veterinary products are discussed in many places, namely: warnings on use of anthelmintics (p. 604 and p. 729); kamala valueless as poultry anthelmintic (p. 620); dangerous drugs "for animals only" (p. 716), such as sulfanilamide (p. 719); irrational preparations (p. 731); toxic substances to promote fattening (p. 759); and penicillin (pp. 759-761). ● ● ●

▼ ▼ ▼

DANNY AND THE DOG DOCTOR, by *Jerrold Beim.* 44 pages, 23 illustrations. William Morrow & Company, New York, publishers, 1950.—Price $2.00.

Not often does the veterinarian figure as the hero in modern literature. In this new book for children, the author presents the veterinarian as an understanding friend of children and animals. Danny goes the rounds with Doctor Woolf, sees him treat cows, horses, canaries, and learns much about animals.

This children's book would be a welcome addition to the usual waiting room periodicals and would be an ideal gift for a veterinarian's young friends.

RADIOLOGY IN SMALL ANIMAL PRACTICE; A TEXT ON APPLIED RADIOGRAPHY AND DIAGNOSIS, by *Gerry B. Schnelle,* V.M.D., Assistant Chief Veterinarian of the Angell Memorial Animal Hospital, Boston, Mass. Second edition. 351 pages, 305 illustrations, cloth bound. The North American Veterinarian, Inc., Evanston, Ill., publishers, 1950.—Price $8.00.

During recent years, veterinarians have taken increased interest in *x*-ray as a supplementary diagnostic aid. This applies primarily to those who handle a large number of small animals and who are located in or around urban areas. Its use, however, is in no wise restricted to such specialists.

X-ray apparatus offers the veterinary practitioner an objective means of establishing accurate diagnoses. In this sense, as indicated in the foreword, radiographs give dependable aid in animal work where their use may not be indicated in human medicine. Their value lies in the assistance given the clinician or surgeon to operate more efficiently and thus effect superior final results. Furthermore, following the healing progress by radiographs in skeletal fracture reduction, the veterinarian is afforded a guide to improved technic which is certain to reveal unsuspected imperfections and to minimize unfavorable malposition and malunion.

Radiology is defined as the practice and art of making radiographs. This book treats of fundamentals and basic principles involved, equipment and facilities, exposure factors, position, and immobilization in *x*-ray work. This porton (part 1) is strictly radiology. Parts 2 and 3 deal with injuries and diseases of the bones and joints and radiography of soft tissue, respectively.

In chapter divisions of parts 2 or 3, more material is given than implied by the title. Helpful suggestions for diagnosis and hints on treatment are given; the whole well illustrated by many radiographs showing first the normal structure of a part or region, followed by views of anomalies as observed in practice. Fractures, dislocations, abnormalities, osteoarthritis, osteomalacia, congenital malformations, and osteogenic sarcoma are a few of the

conditions considered briefly and illustrated by reproductions from positive prints of excellent *x*-ray plates. Radiographs of foreign bodies, strangulation, diaphragmatic hernia, etc., are reproduced in part 3. Brief discussions of these conditions are included.

Radiotherapy, by Dr. Myron Thom, Pasadena, Calif., is included with this second edition as a separate section of the text. This introduction to a field comparatively new to veterinary practitioners should create interest in many and encourage familiarization with the theories and practice of *x*-ray therapy.

The entire text is a commendable study and reference work that will prove valuable to the clinician who does not have available the services of a roentgenologist but who must train himself and his assistants in the use of apparatus and diagnosis by radiographic findings.

▼ ▼ ▼

Foreign Veterinary Textbooks

The following books have been received recently for review:

VETERINARY COUNTER PRACTICE. Tenth edition. 492 pages. The Chemist and Druggist, London, W. C. 2, publishers. An anonymous editor wrote this survey of animal diseases and their treatment. It contains numerous prescription formulas and is up-to-date as far as pharmaceuticals are concerned but not with respect to insecticides and disinfectants.

EINFUHRUNG IN DIE HOMOEOPATHIC FUR TIERARZTE, by Dr. Franz Schoemmer. Second edition. 264 pages. M. & H. Schaper, Hannover-Waldhausen, publishers. This homeopathy for veterinarians is untimely in this century of chemotherapy; it does not even mention the sulfonamides, antibiotics, hormones, and vitamins, but recommends many vegetable drugs and chemicals, some of which are valuable, others obscure.

LEHRBUCH DER ALLGEMEINEN PATHOLOGIE FUR TIERARZTE, by Dr. Theodore Kitt, revised by Drs. O. Seifried, P. Cohrs, and R. Baumann. Seventh edition. 457 pages and 11 color plates. Ferdinad Enke, Stuttgart, publisher. This is a standard text on pathology for veterinarians, written by an internationally recognized authority, Professor Kitt (who died in 1941). The new edition (1950) was prepared by three experts, the heads of the pathological departments of the veterinary colleges of Munich, Hannover, and Vienna. About 150 excellent illustrations and the clear discussion of all the problems and findings of pathology and its working and research methods make this an outstanding textbook.

DIE TIERISCHEN PARASITEN, by Dr. Josef Fiebiger. Fourth edition. 436 pages. Urban & Schwarzenberg, Wien, publisher. The "Fiebiger" is a well known reference book on all animal parasites found on pet and farm animals and on man. Over 400 illustrations and a number of tables and indices make it valuable.

LEXIKON DER PRAKTISCHEN THERAPIE UND PROPHYLAXE FUR TIERARZTE, by Dr. David Wirth. 2 volumes. 1052 pages. Urban & Schwarzenberg, Wien, publisher. Here is a literary work which, in the opinion of this reviewer, has no equal in the English language—a complete encyclopedia of the practical therapy and prophylaxis for veterinarians. With the help of 12 outstanding collaborators, among them F. Benesch, J. Fiebiger, and J. Schiller, editor Wirth compiled in thousands of articles the latest information on animal diseases and their prevention and treatment with the help of dependable old and new remedies. Both volumes are well illustrated and printed on fine paper. Editor, authors, and publishers are to be congratulated on a job well done. Any veterinarian able to read German should have this encyclopedia on his desk; he will find it a great help in his daily work, be it practice, research, or teaching. ● ● ●

▼ ▼ ▼

VETERINARIAN, by *Thomas J. Jones*, B.S.A., D.V.M., M.S., Ph.D., Dean, School of Veterinary Medicine, University of Georgia, Athens. 28 pages. Research Publishing Company, Inc., 687 Boylston St., Boston 16, Mass., publishers, 1949. Price $1.00.

No. 3 on the list of American occupation monographs, Veterinarian provides information which will give guidance to high school and college students who may be interested in the opportunities offered in the profession.

This booklet introduces the reader to the field of endeavor and the relation and import of the services rendered by veterinarians to society. Personal qualifications and aptitude are emphasized, as are requirements of individuals and hazards involved in the work. Generally, the monograph is encouraging, offers many advantages if personal satisfaction in one's work is considered over pecuniary returns.

The booklet should serve an excellent purpose as a brief introduction for those who seek information about the profession.

The Professional

CORN BELT LABORATORIES, INC.

The Veterinarians' Institution—Established 1913

EAST ST. LOUIS, ILLINOIS

VETERINARY ITEMS OF INTEREST

The blue gray chinchilla is said to have at least 80 hairs arising from each hair follicle. This density of growth makes chinchilla hair stand directly away from the body, or, stated otherwise, it does not lie down, and in motion it creates a shimmering effect. Taken as a whole, the fur is comparatively very light weight.

▼

As a result of studies on the effect of radiation following the Bikini atom bomb tests, it was noted that blood changes almost identical to those observed in pernicious anemia in man occurred in pigs exposed to atomic radiation. It has been suggested that pigs might be useful in further experimentation in pernicious anemia.

▼

Estimates made by the United States Bureau of Census indicate a decline in farm population of 9.1% during the period 1940 to 1949. Farm residents now make up only about 12% of the total population of Ohio, whereas they comprised nearly 20% in 1920.

▼

Over 26,000 small forms of animal life were examined during the past year for the larval stages of the fringed tapeworm of sheep, *Thysanosoma actinoides,* with negative results —Annual Report of the Chief, BAI.

▼

The number of animals in all classes of livestock and poultry turned upward during 1949 after five successive years of decline.—*Agr. Sit.*

▼

More than 97% of men wounded in the recent war, survived; resources of blood and plasma played a big part in the lifesaving.—*S.N.L.*

▼

Clippers, Clarets, Roundheads, Falcons, Warhorses, Travelers, Dare Devils, Fardowns, Low Greys, Shawls, Aseels, Miner Blues, Brown-Reds, and Mugs are a few breeds of chickens—game fowl.

▼

A rubber bottom nest has been patented by an Arizona poultryman. The rubber is molded so that it slopes to a center flat spot, which is cut to allow the egg to drop to a screened floor below and in front of the nest.

During the past ten years, 10,166 dogs and 400 cats were imported and passed through quarantine stations in Great Britain. Of these, nine dogs died of rabies while under detention. (*The Veterinary Record,* March 4, 1950). It is the opinion in that country that the detection of this and other diseases of animals by quarantine, preventing the possibility of widespread outbreaks, justifies the methods employed.

▼

The overall cost to vaccinate one animal with foot-and-mouth disease vaccine has been reduced from $21.77, (cost in July 1948) to $0.395 (cost in December 1949).—General Harry H. Johnson.

▼

The National Dog Welfare Guild has offered a $1,000. research award to any person providing a way to better health for dogs.

▼

The horse has the largest eyes of any land animal except the elephant; this accounts for its excellent vision both day and night.

▼

The skin is the body's largest organ. Its surface area is from 18 to 20 square feet in an adult; its weight about twice as much as the liver.—*S.N.L.*

▼

Derris powder, containing 8% rotenone proved superior over other insecticides for cattle grub infections in Finland.

▼

The addition of a small amount of beta-methyl anthraquinone, a compound obtained from Burma teak, makes DDT a more potent insecticide.—*S.N.L.*

▼

If it were possible to provide an American diet for all the peoples of the world, we would be able to feed less than one-half the present world population.—A. A. Brock.

▼

A "death ray" machine has been developed which will kill insects by shooting electrons in blasts lasting 1/1,000,000 sec., at 12 in. range.

▼

An electronic knife has been developed for killing chickens and turkeys, in processing plants.

kin preparations introduced
nd still gaining in popularity

AQUEOUS RESO-LYPTOL is a soothing detergent and astringent quid for skin affections and moist cankerous ear conditions, and a dressing for denuded skin areas. It is a favorite among small animal practitioners for its quick coating and drying qualities, as well as for its gentle, soothing action. Easily applied to small areas without hair clipping. Once dry, will not rub off or soil furniture or clothing.

OLEUM RESO-LYPTOL is a similar formula with a vegetable oil base, commended where skin is dry and scaly and needs lubrication as well as emollient action. Used chiefly for cankerous, wax and crusty ear conditions, especially when ear is so irritated that immediate swabbing and cleansing is practical. The ear canal is filled with Oleum Reso-Lyptol and left overnight, or until irritation is relieved and wax or crust softened. After cleaning, the canal can again be filled with Oleum Reso-Lyptol and left as long as necessary.

SINCE 1888
as trustworthy
as time itself

SYRACUSE
PHARMACAL COMPANY, INC.

11-215 WOLF STREET, SYRACUSE 8, N. Y.

Distributed by H. C. Burns Co., Inc., Oakland, Calif. and Portland, Ore. • Jack Webster, Oakefield, Mass. • Fox Drug Co., Carthage, N. Y. • A. A. Gutekunst, Grass Lake, Mich.